

For Men Who Manage

DECEMBER 1956

For the Editor A PUTMAN PUBLICATION / Executive Magazines for Industry

chemical processing



CHRISTMAS STARS

lights on cat cracker shine down on Shell Oil's
Houston refinery, creating likeness of giant Yule tree
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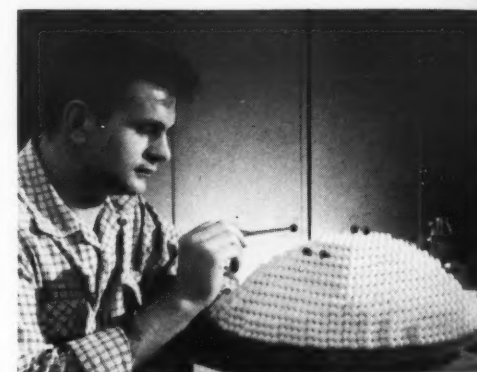
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**THAT'S
INTERESTING**

Getting to know—catalysts

Exactly how a catalyst does work is what researchers at New Parma, Ohio in National Carbon Co.'s laboratories are finding out. By conducting tests at about -454°F . oxygen atoms, for example, will stick to catalyst surfaces but not react with other atoms. Then by raising the temperature, catalytic-type reaction will take place in slow



Model of the point of a tungsten needle magnified 100,000,000 times

motion. Two electronic field emission microscopes will be used to study motions of atoms across catalytic surfaces, measure forces required to make particles "stick" or to remove them, and determine exactly what molecules or atomic complexes form on specific surface site.

Models can be constructed (as shown above) to illustrate what happens on tungsten surfaces in regions in which dimensions are measured in billionths of a billionth of a square inch.

Visitors from outer space

Jewel-like bits of glass that have been found scattered in many places over the earth's surface have caused considerable speculation. These small pieces of meteoric material, ranging in weight from an ounce to more than a pound, have unique physical and chemical properties. They are found in both irregular and symmetrical forms; are estimated to be about 100 million years old; and have an unusually high melting point, about 200°C above that of manufactured Pyrex glass.

Meteoritic theory postulates that the glasses, called Tektites in the United States, were located somewhere on or near the surface of a planet situated between Mars and Jupiter. When the planet broke up for some unknown reason, these glasses were spread throughout space, some finding their way to earth. Further study of their structure may yield information on the theoretical lost parent planet, and consequently contribute to our understanding of the earth's structure and the formation of the solar system. (Arthur D. Little, Inc., *Industrial Bulletin*.)

(Please turn to page 215)

chemical processing

with which is combined
CHEMICAL PROCESSING PREVIEW
and Chemical Business

for men who manage

Vol. 19

December 1956

No. 12

CHEMICAL PROCESSING Magazine serves
American industry wherever chemicals and chemi-
cal processes are involved.

Basic Chemical and Chemical Processing Industries

| | |
|---|---|
| Industrial inorganic & organic chemicals (acids, alkalis, plastics, synthetic fibers, explosives, etc.) | Miscellaneous chemicals (cosmetics & toiletries, inks, insecticides, water treatment chemicals, etc.) |
| Drugs & medicines | Paper & allied products |
| Soap & cleansing products | Petroleum, coal, coke-oven products |
| Paints, varnishes, lacquers | Rubber products |
| Gum & wood chemicals (Naval Stores) | Stone, clay & glass products |
| Fertilizers | Atomic energy establishments |
| Animal & vegetable oils & fats | |

Other industries utilizing chemicals or chemical processes

| | |
|--------------------------------|---|
| Food and allied products | tographic film, instruments, fabricated plastic products, etc.) |
| Textile dyeing & finishing | Water treating & purification plants |
| Leather tanning & finishing | Government (incl. ordnance, missiles, etc.) |
| Metals & alloys | |
| Machinery & equipment | |
| Allied products (tobacco, pho- | |

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DECEMBER 1956

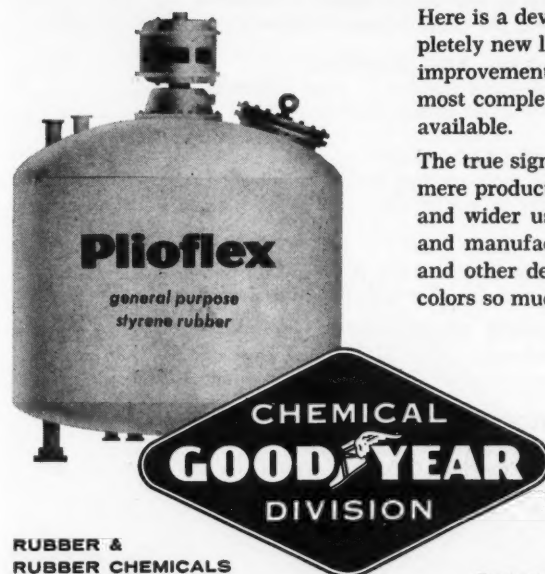


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Search for missing data

My name is Weyermuller, I'm Associate Editor for *CHEMICAL PROCESSING* . . . often play the role of detective . . . cover great deal of territory, ferret out and track down good stories.

Example . . . case history article on low-fin tube in heat exchangers, this issue. To develop story, cased industrial exposition in Kansas City, sleuthed seminar in Chicago . . . probed deeper in visit to tube manufacturer in Detroit. Stopped by his regional office in Houston to develop good story lead.

Hot lead developed at natural gasoline plant in Midwest . . . investigation showed installation not in long enough for company to evaluate it. Checked six months later, story ready to go . . . plant visited, photos taken, on-the-spot "M.O."* details obtained from plant superintendent. Said tests had been run on exchangers . . . didn't have data . . . thought it should be in home office 200 miles away.

Followed up at petroleum company's main office . . . were told they didn't have data . . . should see local representative of fin-tube manufacturer in that city. Telephoned his office . . . Ugh! . . . out of town.

Missing data finally located when visit made to company that designed and installed exchangers. Manager of heat exchange division calculated results from data . . . fin tube performing 32% better than design!!

With complete facts and photos, story written, approved . . . appears on page 138, this issue. Case solved . . . end of report . . . dum, dee, dum, dum!

*Modus Operandi

Gordon Weyermuller

ASSOCIATE EDITOR

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• The product directory, pages 205 to 208, is your guide to all articles and advertisements

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THIS MONTH'S COVER

The Holiday Spirit is captured on the cover by a Shell Oil "Christmas-tree-like" cat cracker in Houston, Texas, refinery. Recently developed Micro-Spheroidal catalyst is used in the low-pressure unit. Refinery pipes some of its products to nearby Shell Chemical plant for further processing into petroleum chemicals.



December 3. Synthetic Organic Chemical Manufacturers Association, annual meeting, Hotel Biltmore, New York.

December 3-5. Air Pollution Control Association, semi-annual meeting, Rice Hotel, Houston.

December 3-5. Chemical Specialties Manufacturers Association, annual meeting, Mayflower Hotel, Washington, D.C.

December 4-5. Seventh SPI Film, The Society of the Plastics Industry, Inc., Commodore Hotel, New York.

December 9-12. American Institute of Chemical Engineers, annual meeting, Statler Hotel, Boston.

December 10-12. American Pharmaceutical Manufacturers' Association, winter meeting, Waldorf-Astoria Hotel, NYC.

December 11. Proprietary Association, Scientific Section, winter meeting, Waldorf-Astoria Hotel, New York.

January 16-18, 1957. Thirteenth Annual National Technical Conference, Society of Plastics Engineers, Hotel Sheraton-Jefferson, St. Louis.

January 28-31. Eighth National Plant Maintenance & Engineering Conference, Public Auditorium, Cleveland.

January 31. American Institute of Chemical Engineers, technical session, Nicollet Hotel, Minneapolis.

February 5-7. Twelfth SPI Reinforced Plastics Division Conference, The Society of the Plastics Industry, Inc., Edgewater Beach Hotel, Chicago.

February 25-March 1. Thirteenth International Heating & Air Conditioning Exposition, International Amphitheatre, Chicago.

February 26-28. The 1957 Western Joint Computer Conference, Statler Hotel, New York.

March 3-6. American Institute of Chemical Engineers, Greenbrier Hotel, White Sulphur Springs, Va.

March 11-15. Atomic Exposition and Nuclear Congress, Convention Hall, Philadelphia.

March 11-15. National Association of Corrosion Engineers, Thirteenth Annual Conference and Exhibition, Kiel Auditorium, St. Louis.

March 18-21. Society of the Plastics Industry Annual National Conference and Pacific Coast Plastics Exposition, Hotel Biltmore and Shrine Exposition Hall, Los Angeles.

March 25-29. Tenth Western Metal Congress and Exposition, Pan-Pacific Auditorium, Los Angeles.

March 27-29. Nineteenth Annual American Power Conference, Hotel Sherman, Chicago.

April 7-12. American Chemical Society, national meeting, Miami, Florida.

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EUROPEAN OFFICE

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Leonard Hynes, vice-president and director of Canadian Industries Limited was born in Toronto. After attending St. Michael's College, he entered the University of Toronto where he obtained a Bachelor of Arts degree in 1932 and his M.A. a year later. Following graduation he joined C-I-L as a chemist at the company's Hamilton works.

Following a year's experience in the Toronto sales office, he was transferred in 1935 to the company's head office in Montreal where he acquired experience in research, sales and administration. In 1943 he was appointed secretary of C-I-L's management committee, and five years later he became assistant manager of the company's paints and coated fabrics operations in January, 1951, and vice-president and director in 1954.

Canadian Chemicals Today... and Ten Years From Today

LEONARD HYNES

Vice President
Canadian Industries, Limited

In Canada, as in the United States, the first thing the chemical maker asks himself when planning new production is "How large is the domestic market for this chemical?" In Canada, the answer "Not large enough at this time for economical production" is encountered much more frequently than in your country. To begin with, Canada's population is only about one-eleventh of that of the United States, and our per capita consumption of chemicals is only a half of that in the United States. Moreover, the potential market is still further reduced because this small population is sparse, making distribution costs high. Therefore, the domestic market available to many potential producers of chemicals is often too small to justify plants large enough to compete with imports.

In fact, of our total imports of chemicals and allied products during 1955, about 85 percent was supplied by the United States; and this proportion has been increasing over the last three decades. But despite disadvantages, our chemical industry and allied products has been growing rapidly, and in 1955 production exceeded \$1,000 million for the first time.

What made this possible? The Canadian chemical industry has undertaken supply of an increasing number of chemicals because a number of special advantages have in many cases more than offset the effects of a small domestic market on production costs, thus enabling domestic producers to meet import competition.

One of the most important of these special features has been the indirect export of the chemicals used in processing Canada's natural resources. Direct exports have also provided an enlarged market for the limited number of Canadian chemical products. For example, over 70 percent of

Canadian fertilizer production was exported in 1955.

What, then, is the outlook for Canadian chemicals for the next decade? Of course, production of those chemicals already made here can be expected to rise with Canada's general economic advance. For example, demands for paint and sulfuric acid will continue to be supplied largely by domestic sources. And we're confident that expansion of consumption capacity for chemicals now produced in Canada will make a substantial contribution toward keeping the chemical industry well up on the list of Canadian growth industries.

The prospect for continuing the present rate of diversification to previously imported synthetic organics, however, is not so encouraging, principally because of the absence of favourable factors promoting growth in this direction. For example, low freight costs are not of much assistance on most synthetic organics because they are generally of high unit value. Also, Canada's raw material position does not give an advantage over foreign competition in most synthetics, as hydrocarbon sources are widely and cheaply available in most other countries. Too, the chemical industry's diversification of recent years has already accounted for most of the areas for which tariff assistance is available.

Dyestuffs provide a good example of the effects of our small domestic market. Canada's dyestuff requirements have always been met entirely by imports; the situation will undoubtedly continue for many more years. It is doubtful whether even a substantial tariff on both dyes and textiles would permit the erection of a domestic dyestuff plant. Petrochemicals illustrate an intermediate area where continued growth is to be expected as the

Canadian market expands. The value of petrochemical production has grown from \$24 million in 1947 to \$127 million in 1955, but attractive new petrochemical projects are becoming increasingly difficult to find and there will undoubtedly be some leveling off during the coming decade.

Future Importance of Imports

This brings me to a point where I should try to forecast how important imports will be during the next decade in relation to the total demand for chemicals by Canadian industry. All I shall say is that the available evidence leads me to expect that imports will continue to represent at least 20 percent of Canadian consumption during each of the next ten years. However, some things could happen which could conceivably affect this prospect, and although I doubt whether any one of them could radically change the outlook for the supply of chemicals over the next ten years, I have chosen three to discuss.

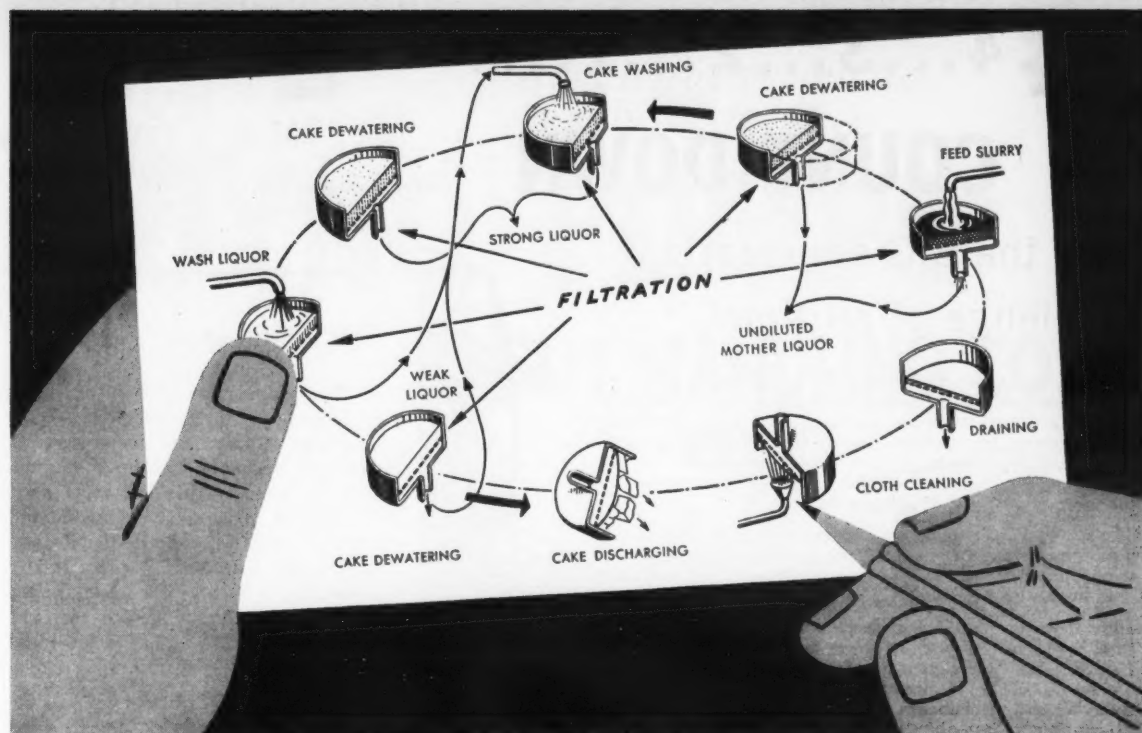
Exports

I mentioned earlier that export markets have made it possible to undertake domestic production of some chemicals. What are the prospects for further diversification in the organic chemicals with the assistance of export markets? Unfortunately I can see little hope of building new plants based on sales of organics abroad. Some exports of these products did arise in a period of post-war shortages, but foreign countries are now building their own plants. Moreover, the growing strength of the United Kingdom and Germany and their increasing penetration of world markets impose further limitation on Canadian opportunities for chemical exports.

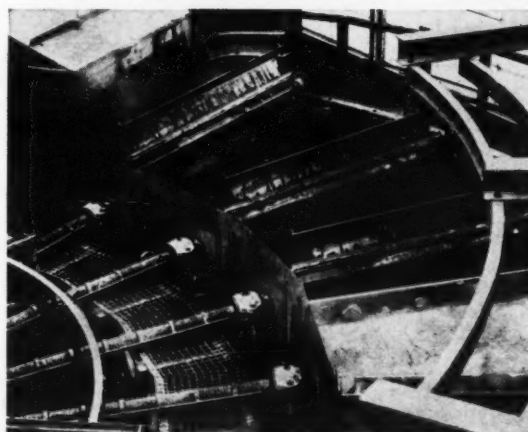
Tariffs

Tariffs have been suggested as a possible means of maintaining the rate at which Canadian suppliers have recently been moving towards diversification. The area in which such assistance would be effective is revealed by examining the nature of Canadian imports. First, there are those materials, largely heavy industrial chemicals which are made here but for which producers abroad enjoy a freight or raw material advantage. Second, there is a large number of small-volume specialty chemicals which could not be manufactured economically in Canada, even with the tariff which they would automatically receive. Finally, a number of medium volume synthetic resins and other synthetic organics enter this country either duty-free or with a very low rate of duty. It is into this last class that the next step in the chemical industry's growth should normally be. But these materials

(Please turn to page 204)



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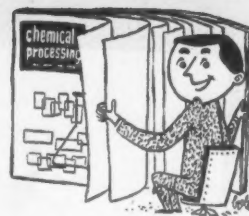
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looking ahead

to next month...

What's ahead for... 1957?

The phenomenal growth of the chemical industry — three times the average of all industry today, and some suggest that it might be five or six times the average in a few years — has left little time to stop and look about us. Now, at the end of the most successful year in the history of the industry, **CHEMICAL PROCESSING** has asked leaders in each of the several major fields that it serves to tell what they see in the coming year. Here are some of the things they say:

"The chemical industry anticipates continued strong demand for its products in 1957 on the basis of a high-level industrial activity, and may continue to outpace industry generally," according to Allied Chemical & Dye's president, Fred Emmerich.

Spencer Chemical's Kenneth Spencer reports: "We anticipate . . . that total plant food use will increase in 1957 over 1956, but that it will be an even more competitive year." And from Goodyear's president, E. J. Thomas, ". . . the rubber industry is prepared to play its important part in a forward surge of progress and prosperity the like of which the world has never seen before."

John McKeen, president of Chas. Pfizer, states, "Intensive research, growing populations, new plants around the world, and a strong domestic economy . . . indicate gains in the pharmaceutical industry's business volume in the years ahead."

The Federal road-building program, anticipated high-level automobile production, continued levels of building, growing population, and increasing living standards should, say many, make 1957 another record year.

Look at 1957 through the eyes of these top men of industry . . . in next month's **CHEMICAL BUSINESS** feature, "The Leaders Speak."

Eliminates pump rebuilding

Every thirty days a stainless steel centrifugal pump at Atlantic Refining's Philadelphia plant had to be torn down and rebuilt while another went into operation. Pump was handling a highly corrosive slurry which hardened on contact with air, making an abrasive, gritty mass of cutting particles.

Obvious solution was to find a pump that could withstand the punishment — and Atlantic did just that. New equipment is still inspected monthly but complete rebuilding is not necessary any more.

Assistant Editor Bill Clarke visited the operation and talked to Atlantic's Leslie R. Henry, Maintenance Engineer, chemicals department. The story of how Atlantic reduced its pumping costs appears in the January New Solutions section.

Urethane uses

Price reductions, formulation improvement, and application experience all lead to one pretty obvious fact: Urethane coatings are becoming more and more important. They are resistant to heat, chemicals, moisture, and abrasion, and can be used across a broad spectrum of applications.



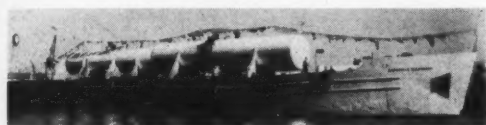
McElroy and McHugh (l to r) talk about urethane enamels

January's Materials section brings you the story of how one urethane application was developed . . . at the Schenectady Varnish Company, a leader in the field of urethane wire enamels. Assistant Editor Frank Mc-



Here's a quick preview
of features you'll find
in January **CHEMICAL PROCESSING**

Elroy, on a New York junket, talked to Schenectady Varnish's VP, J. W. McHugh, then wrote the story that tells how urethanes pay off in this application.



Good to the last whiff

Shell Chemical ships ammonia from their San Francisco plant to the Pacific Northwest three times a month — by sea-going barge handling 1700 tons. And on a warm summer day, tank temperature can reach 100°F and residual gases of anhydrous ammonia can amount to 2 percent of a full tank . . . equivalent to 34 tons.

Problem: How to recover a maximum amount of this material economically.

Shell has adapted rail tank-car unloading methods for recovering a maximum practical amount of material . . . using vapor pumps.

Story in next month's New Solutions section tells how they do it, and what the recovery results are.

Doubles throughput, protects wort, reduces maintenance

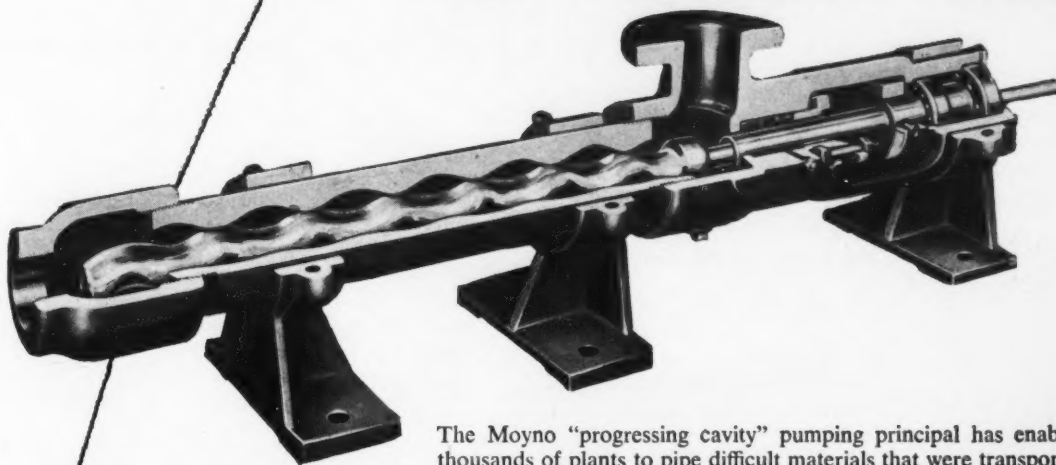
Cooling wort or unfermented beer at the Theo. Hamm Brewing Company, St. Paul, Minn., was a slow and difficult-to-control procedure. Open-type cooler processed only 300 barrels an hour. In addition, accumulation of deposits on exposed cooler coils resulted in time-consuming maintenance . . . it required six men an entire day to clean the unit. Exposure of wort to room air also created the problem of air entrainment in the wort.

Increased production demanded a faster pace. The company installed a new cooling system, handling more than twice the previous production weight . . . and cutting maintenance to one and one-half man hours daily. You'll find the story in January's Processing Equipment section.

MOYNO[®] PUMPS

CUT HANDLING COSTS

*from abrasive slurries
to delicate foods . . .*



The Moyno "progressing cavity" pumping principal has enabled thousands of plants to pipe difficult materials that were transported by hand and other expensive means. Moyno is the only pump that can handle many abrasives, pastes, slurries, chemicals, foods, suspended solids, etc. without foaming, aerating, crushing or excessive pump wear.



As shown above, Moyno Pumps have a screw-like rotor that revolves in a double threaded stator creating progressing cavities which smoothly move material through the pump. They will pump anything that will move through a pipe . . . even plaster and non-pourable pastes!

Moyno Pumps are available in capacities up to 500 gpm and pressures up to 1000 psi.

Examine your processing methods. No doubt there are several places where Moyno Pumps can drastically cut costs. Ask us, we'll give you a frank answer. Send us an outline of your problem today! Write for Bulletin 30-CP



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Motors



Fans



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Moyno Pumps



Propeller (Industrial) Fans

When inquiring check 9246 opposite last page

**new solutions
of processing problems**

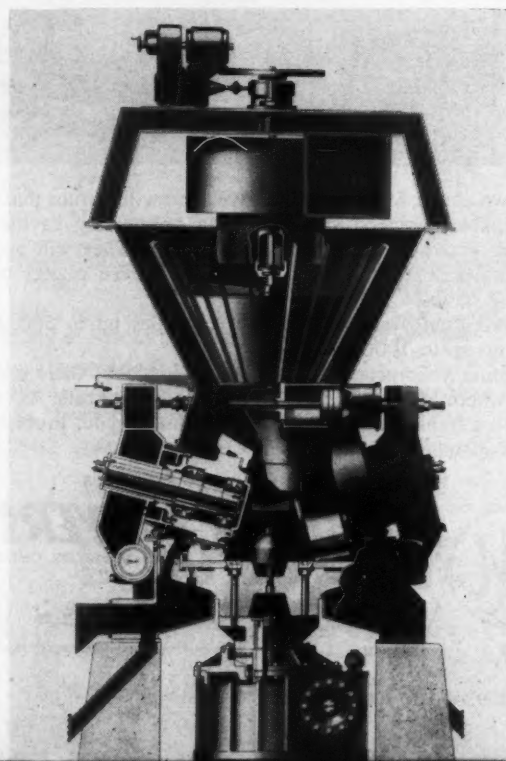
Summit Mining Corporation boasts first domestic installation of new type mill. Operating efficiently and automatically, the disc roll unit simultaneously . . .

grinds, dries, classifies and speeds sericite processing

Hinged-door arrangement on mill reduces roll-changing down-time by 83 percent

TED F. MEINHOLD, Assistant Editor
with **GEORGE W. AHL, JR.**,
President and General Manager
Summit Mining Corporation

Cross-section of disc roll mill. Rolls can be easily removed by means of swing-door arrangement (right center). Vertical blade attachment at top of unit is "Gyrotor" classifier

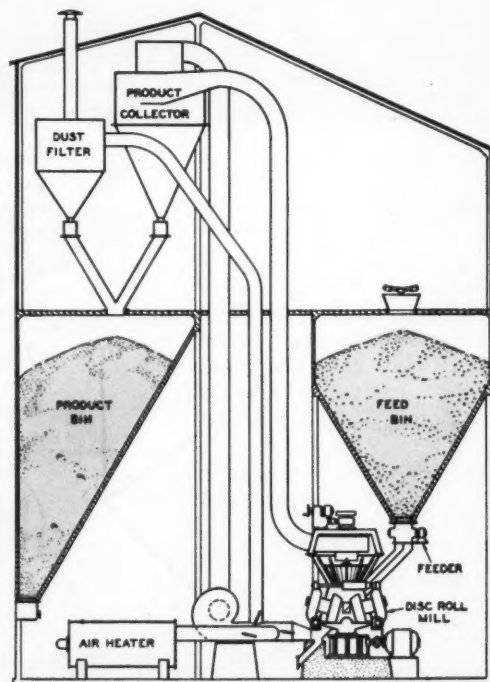


PROBLEM: When the demand for their refined hydrous alumina silicate product reached the point where existing production facilities were no longer adequate, Summit Mining Corporation, Carlisle, Pennsylvania, decided to build a new plant. One of the biggest problems was the proper selection of fine grinding equipment for the material. Engineers knew, from experience with their old equipment, that this could be the key factor

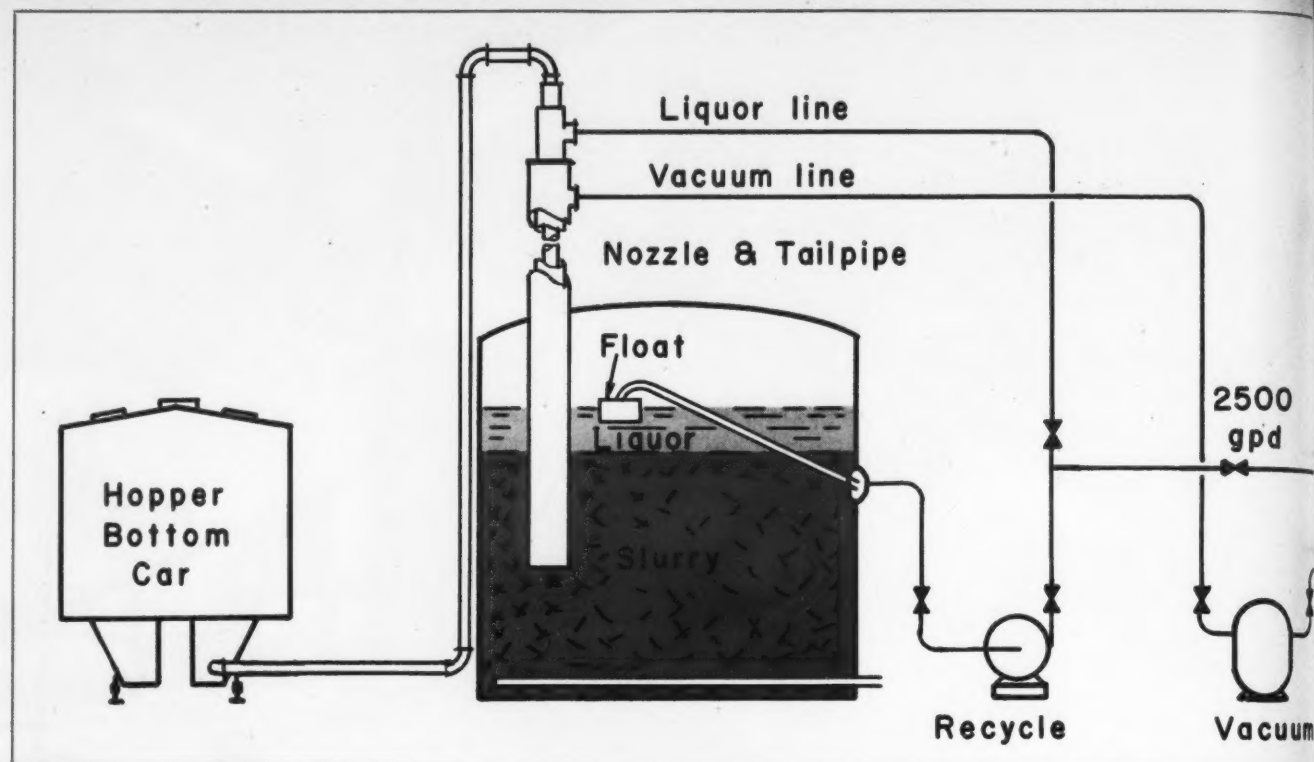
(Please turn to page 22)

Aerial view of Summit Mining's sericite rock processing plant at Aspers, Pennsylvania

Here's how disc roll mill fits into processing system



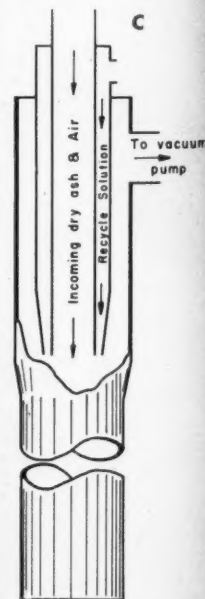
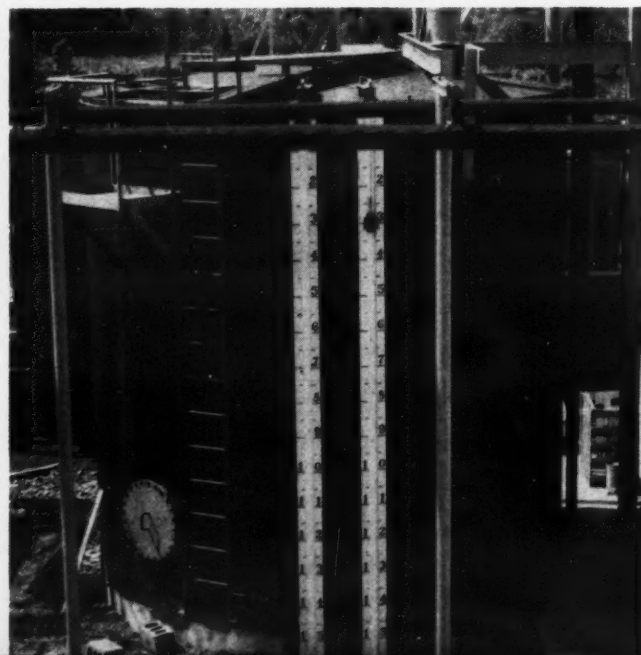




A

Pneumatic system carries soda ash from hopper cars (A) into storage tank (B) through tailpipe (C) which mixes dry ash and recycled solution. Control house (D) adjacent to storage tank holds vacuum and recycling pumps, control and indicating panel

B

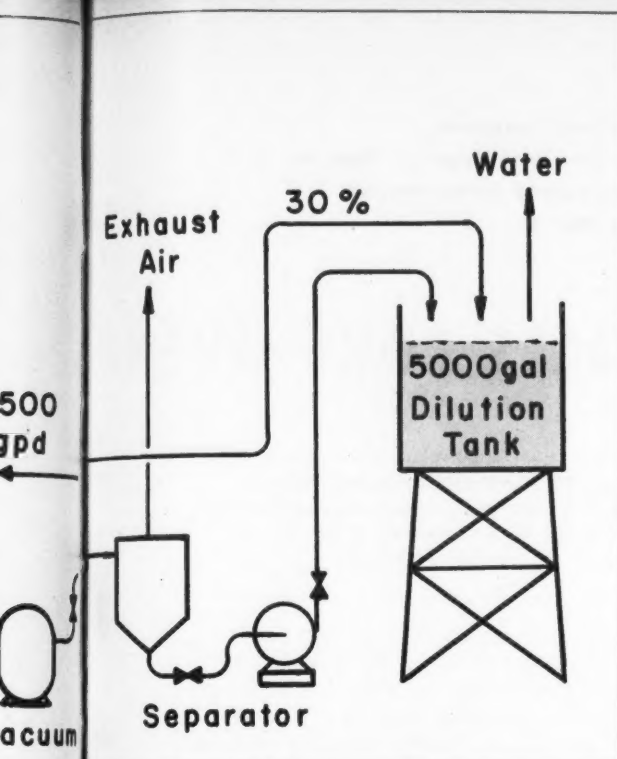


C

Large dollar savings, reduced handling efforts
result from a Reheis Company installation of a
system to . . .

STORE AND HANDLE SODA ASH AS SLURRY

BILL SCHREMP, Assistant Editor
with STEWART M. BEEKMAN, Director,
Engineering & Development, Reheis Company, Inc.



D

Problem: Fine inorganic chemical manufacturer, Reheis Company, Inc., Berkeley Heights, New Jersey, uses large quantities of soda ash. Previously, manual handling of bagged material required considerable manpower as well as large storage area. Two-or-three-time handling of material also opened possibilities of bag ruptures, resulting in dusty conditions as well as possible contamination. Everything, including cost, pointed to bulk handling of ash.

Solution: Reheis installed system for handling soda ash in slurry. Installation consists basically of pneumatic system for unloading and slurrying dry material from railroad hopper cars, a slurry tank, and dilution tank. The pneumatic system is of unique design employing wet separator rather than conventional bag-cyclone type.

Principle of converting dry sodium carbonate into a storable slurry (CHEMICAL PROCESSING, page 114, April, 1955) is simple. It is merely one of transforming dry Na_2CO_3 with a bulk density of 35 lb/cu ft into a wet sodium carbonate monohydrate with a density of 56 lb/cu ft. Relative storage volume requirements for handling a 35-ton carload of soda ash are:

| Type Storage | Density | Storage Volume |
|--------------------|-------------------|----------------|
| Slurry | 56 lb/cu ft | 9400 gal |
| Dry | 33 to 35 lb/cu ft | 15,000 gal |
| Saturated Solution | 24 to 25 lb/cu ft | 22,000 gal |

In actual investment it would cost about \$46 to store one ton of soda ash as dry material as against \$27 to store a ton that has been slurried. A 10,000-gal tank could hold 75,000 lb of soda ash stored as a slurry, 47,000 lb stored dry, and

only 33,000 lb of the material stored in solution.

Soda ash is drawn from hopper cars by pneumatic unloading system, entering tank through separator nozzle where it is mixed with recirculated soda ash solution. Monohydrate is formed by both crystallization from recycled solution and hydration of dry soda ash. Monohydrate formed is dense and settles rapidly, making a clear solution available for recycling or draw-off. Loading of tank is continued until approximately 92% of its volume is composed of slurry.

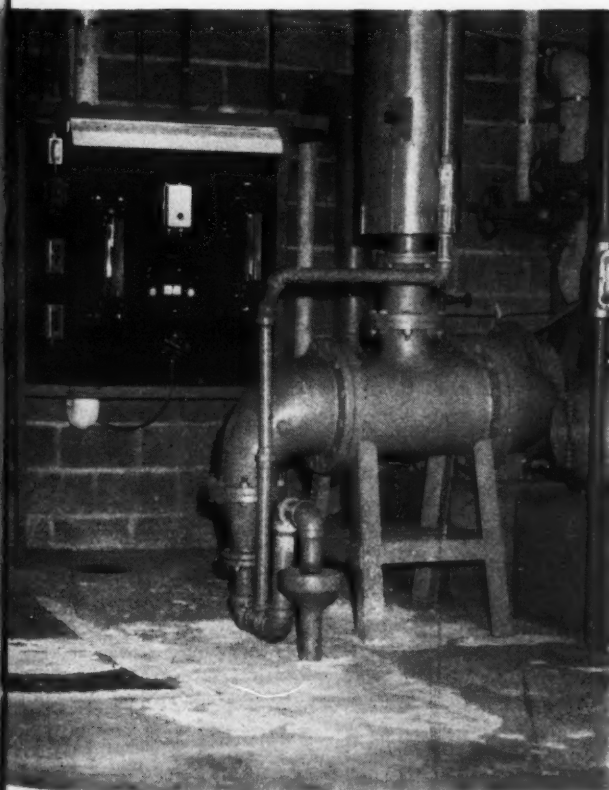
Withdrawal of solution

Slurry tank is actually a combination dissolving and storage tank. Use of tank for both purposes eliminates need for any handling of material or separate dissolving tanks or mixers to effect solution of the material.

Water is distributed over bottom of tank through network of pipes. Discharging through sparging nozzles, water percolates up through the bed of monohydrate, dissolving monohydrate and forming saturated solution. Layer of clear solution is withdrawn from upper portion of tank by floating suction pipe and pumped to dilution tank. Once in 5000-gallon diluting tank, material is reduced to concentration of use. Same pump also recycles solution when hopper cars are being unloaded.

Solution pumped from slurry tank is of practically uniform concentration ($30.0 \pm 0.5\%$ soda ash). For this reason, relatively simple control equipment is required when solution is further diluted as it is at Reheis.

(Please turn to page 21)



Crucible Steel, at relatively small expense,
changes packed tower into spray type . . . finds its
capacity is over that of two packed towers despite
the fact that it . . .

BOOSTS COKE OVEN BY

TED F. MEINHOLD, Associate Editor
with C. V. THOMPSON, Superintendent, Coke Plant
Crucible Steel Company of America
Midland, Pennsylvania

Light oil absorption towers
at Crucible Steel. Tower at
left is modified with spray-
type plates

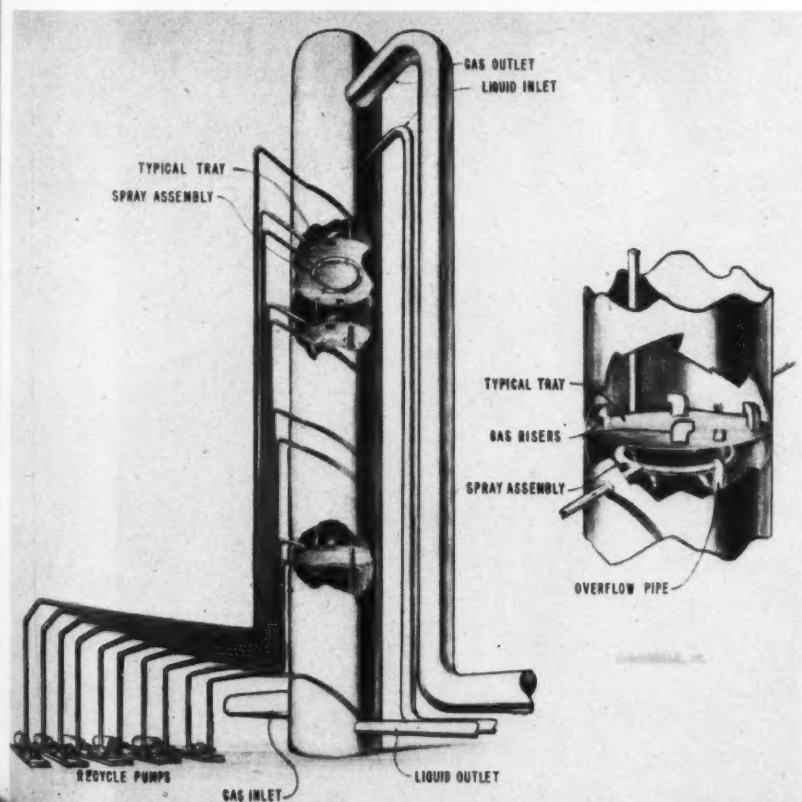
Drawing illustrates features
of spray-type absorber ▶



BY-PRODUCT RECOVERY 20%

Problem: When coking operations were expanded at Crucible Steel Company of America, Midland, Pennsylvania, a few years ago, the existing light oil absorption equipment could not handle the increased gas flow. Amount of pressure that could be used to blow gas through the absorbers was limited by the fixed pressure drop through the system and the exhauster output.

When the gas production was boosted from 33 million to 36 million cfd the excessive pressure drop in the absorbers was beyond the capacity of the exhauster and it became necessary to by-pass part of the gas. Naturally, the light oil content of this gas was lost. Even if there had been sufficient pressure available to blow all of the coke oven gas through the absorbers, it is probable that absorber efficiency would have been reduced unreasonably, especially during warm weather. In fact, even the 75-80% recovery being obtained at the lower throughputs was considered far from satisfactory.



Recycle wash oil pumping station for the modified spray-type light oil absorber

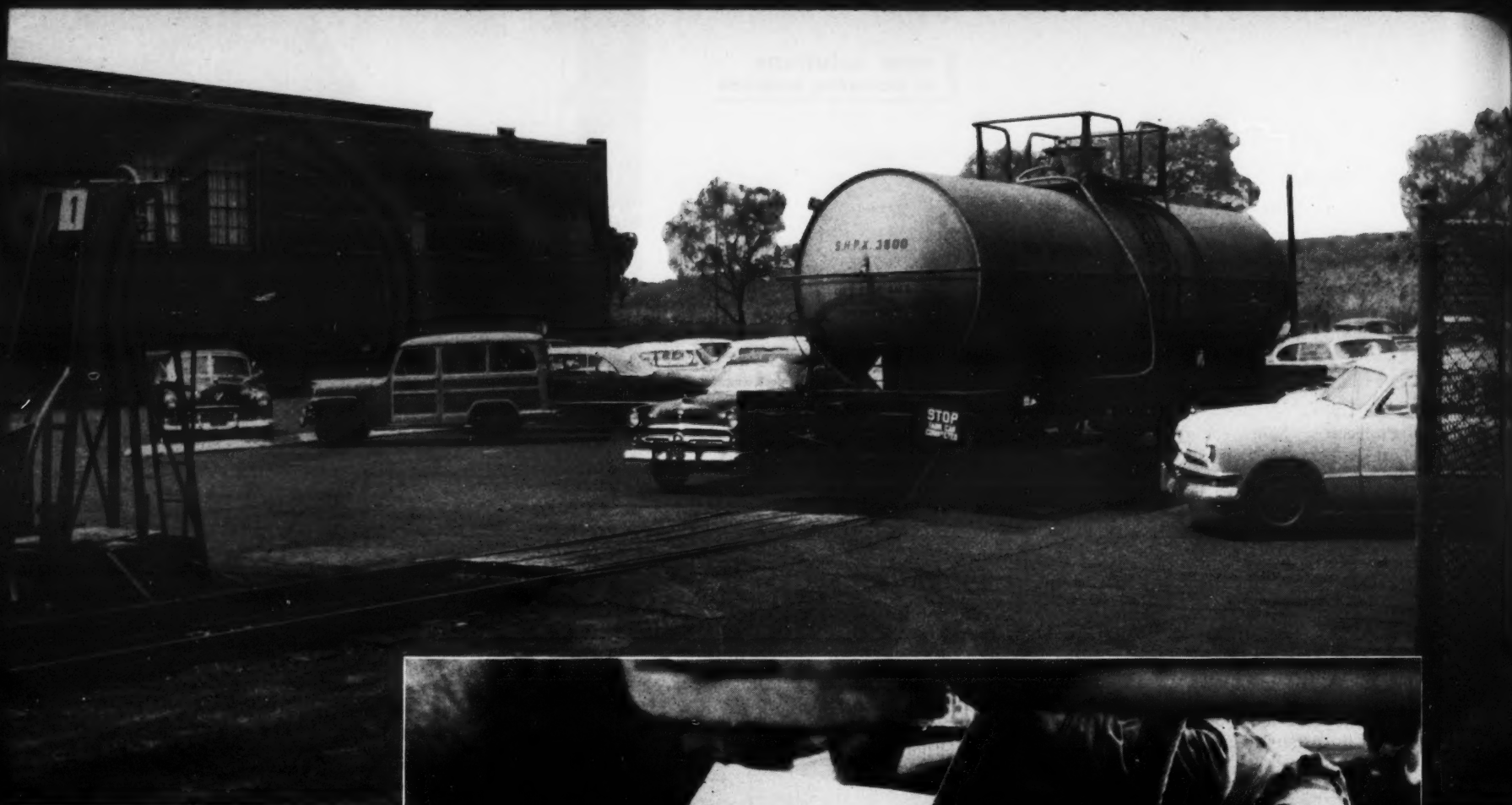
Absorption system consisted of two 14'-ID x 100'-high towers operating in parallel. Each tower contained six sections packed with steel turnings. Operating at maximum capacity, pressure drop through the two absorbers was 16" H₂O. This high differential was due partially to the impossibility of effectively cleaning the deposited solids from the packing.

In the operation, debenzolized wash oil is passed through the absorbers counter-current to the gas. From the absorbers, the wash oil goes to a stripping tower where the light oil portion is removed. Stripped light oil is then fractionated to produce benzene, toluene, and xylene.

Solution: To keep costs down, company decided to modify the existing equipment rather than install additional absorption units. Investigations showed that a satisfactory solution would be to convert one of the absorbers into a spray-type unit, utilizing a design proposed by The Rust Engineering Company. This was done by removing the packing and support plates and replacing them with spray headers and collecting trays. Five spray headers, collecting trays, and circulating pumps were installed along with necessary auxiliary equipment. Wash oil from each collector plate is pumped through the spray assembly above the same plate to produce a mist of wash oil through which the coke oven gas passes. After going through the individual spray sections, gas passes through a packed mist-separation section and then out of the absorber.

Each collecting plate in the absorber has four gas chimneys arranged around the plate's periphery (see drawing). Gas is brought up through the plate and introduced above the liquid level tangentially into the vapor zone to produce a swirling action as it passes through the section.

(Please turn to page 20)



▲ Plenty of room for parkers —

With Pfister's CO₂ unloading system, there are no large storage tanks needed . . . space can be turned over to parking. CO₂ is taken direct from tank car, as demanded by process

Venting CO₂ vapor from liquid line for test



No carbon dioxide storage tanks to tie up capital at Pfister Chemical Works . . .

CO₂ TANK CAR UNLOADS ITSELF

. . . as process demands



WILLIAM C. CLARKE, Assistant Editor
with **ROBERT BRINKERHOFF**, Plant Engineer
Pfister Chemical Works, Inc.
Ridgefield, New Jersey

Problem: To avoid expense and labor of handling CO₂ cylinders, organic chemicals plant of Pfister Chemical Works in Ridgefield, New Jersey, was purchasing its carbon dioxide as dry ice and converting. Daily deliveries of "ice" were required . . . plus insulated storage space to hold dry ice overnight for early morning starts. Insulated storage was also needed to hold "ice" during the day as converter capacity was not sufficient for an entire day's operation.

Plant needs carbon dioxide in large quantities for manufacturing organic intermediates and a host of organic products for dyes and pharmaceuticals.

Solution: Approximately one and one-half years ago, Pfister stopped using dry ice as a source of carbon dioxide. Installation of a patented unloading system allows the company to use liquid carbon dioxide, as needed, directly from shipper's tank car. Mechanically refrigerated and insulated storage tanks for receiving the liquid CO₂ are not necessary since CO₂ vapor is piped directly into process from the steam-heated vaporizing unit.

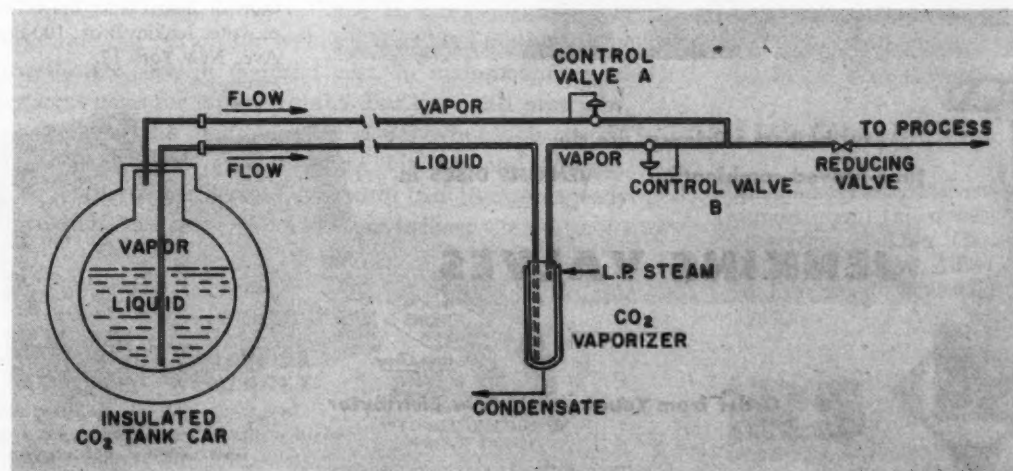
Tank car itself serves as storage. (Cars are leased from supplier of the CO₂ so there is no demurrage.) Simple arrangement of high-pressure steel piping, automatic pressure-operated valves, and steam-heated vaporizer acts to supply CO₂ vapor in large quantities. No electric power is needed.

Requiring two tank car unloading spots on 90 feet of railroad track spur, system uses two lines of high-pressure steel piping, one for liquid CO₂ and the other for CO₂ vapor. Both lines run from tank

(Please turn to next page)

◀ Valve A and B. Vaporizer is at bottom

Control valve A, controlled by car pressure, is open when pressure is 220 psig or higher. Control valve B is open when line pressure is below 200 psig. Distance of tank car to using process not critical



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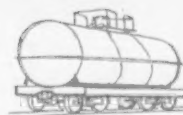
JENKINS VALVES



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NEW SOLUTIONS of processing problems



**CO₂ Tank Car
Unloads Itself**

(Continued from preceding page)

car to a pressure-reducing valve immediately before CO₂ enters process. One tank car unloading station is for car being unloaded. Second is held in reserve for subsequent cars "spotted" before first car is emptied. Stations are connected in parallel to feed steam-heated vaporizer located in building where CO₂ is used. Two automatic CO₂-pressure-operated valves, in 600-foot length of piping between tank cars and vaporizer, control operation of system.

Alternately switching between cars, method of operation unloads one car and then allows a second car to be unloaded while first is being replaced.

First car, when newly arrived, is at a pressure of about 280 psig. It is positioned alongside first station on the track. By means of flexible hoses, liquid and vapor valves on tank car are connected with corresponding valves on fixed piping, and all valves are opened.

Control valve A (see diagram) — operated from up-stream or car pressure — opens, since this pressure is higher than its setting of 220 psig. Control valve B is closed since it operates from downstream or process pressure and opens only below its pressure setting of 200 psig. Both valves are not open at same time.

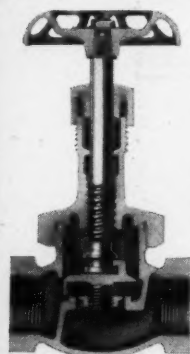
When process needs carbon dioxide, demand is first met from vapor phase of car since only valve A is open. With removal of CO₂ vapor from surface of liquid CO₂, some 120 Btu per pound of vapor removed are absorbed from the liquid. Net effect is to cool the car, causing its pressure to drop from 280 psig to below 220 psig. When pressure within tank car drops below setting of valve A, which is 220 psig, valve A closes. Valve B immediately opens since downstream pressure drops at once below 200 psig with gas from the line being drawn to process.

With valve B open, car pressure forces liquid CO₂ out of the car through the fixed piping to the vaporizer where the liquid is flashed to vapor. Carbon dioxide gas then passes through valve B to the reducing station and to process.

If process demand ceases at any time, liquid within the lines is pushed back into the car since valve B immediately closes. There is no system loss of CO₂. Aside from initial cooling of car on arrival, major portion of vapor is supplied from liquid phase of the car.

System is installed complete by supplier of carbon dioxide, who also leases the tank car. Unloading system will meet any hourly demand for CO₂ from

(Please turn to page 19)





***In small piping too
you get big savings
by welding***

Five years ago, the generally accepted practice among engineers and contractors was to weld non-critical pipe larger than 2-inches and thread the smaller sizes. Today, that dividing line has gone down; much piping as small as 1/2-inch is now being welded. In small piping as in large, the big reason for welding is *to save money* . . . in installation cost, in material cost, in maintenance cost. See next page for typical results. For the small pipe jobs, too, you get the *most for your money* when you specify and buy TUBE-TURN* Welding Fittings and Flanges. Your nearby Tube Turns' Distributor can give you speedy service in sizes from 1/2-inch to 42 inches!

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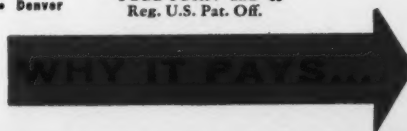
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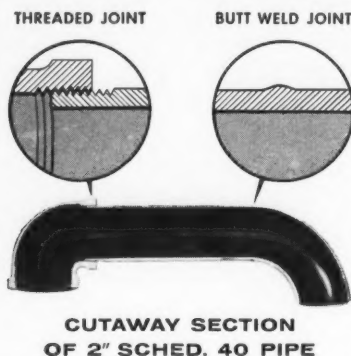
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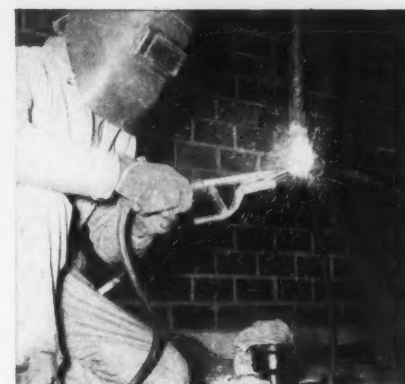
SMALL DIAMETER PIPING... why it pays to specify welded construction with TUBE-TURN Fittings



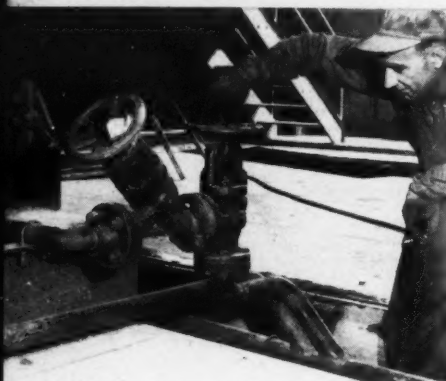
NEVER LEAKS. Welded joints are permanently as strong and leakproof as the pipe itself. Photo shows welded lube oil lines for one of four diesel engines, replacing threaded lines which leaked. If welded in first place, would have saved \$4000 replacement cost. Pipe is 2½" with TUBE-TURN Fittings.



SAVES MATERIAL. Threading cuts half of pipe wall away as shown. The welded joint is as strong as the pipe. An installation of Schedule 40 pipe, welded, is stronger than Schedule 80 threaded. Hence, for equal strength welded piping can cut material costs 30-50%.



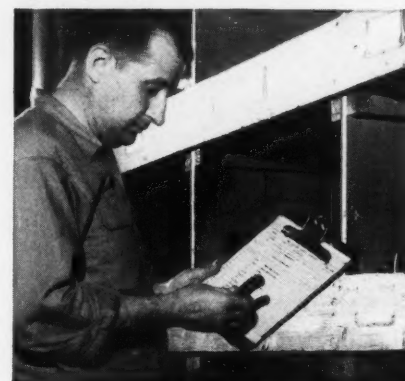
TAKES LESS TIME to weld than to thread pipe above 2" and about equal time for smaller sizes, according to recent tests on hundreds of joints made by many different pipe fitters. Welded joints in 1½" piping such as the school heating line shown, averaged 7 minutes compared to 8 minutes for threading and tightening fitting.



IS COMPACT, NEAT. This installation of 1½" and 2" boiler blow-off piping shows ability to nest welded lines close together for better layout and streamlined appearance. Also, insulation, where needed, is easier to apply.



TOOLS ARE SIMPLE. Small, inexpensive welding outfits can cut, weld, heat to bend, solder or braze. They are easy to haul to job and simple to use. All pipe for this factory radiant heating system was fabricated on the site.



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TUBE TURNS

A DIVISION OF NATIONAL CYLINDER GAS COMPANY
LOUISVILLE 1, KENTUCKY

CO₂ Tank Car

(Continued from page 18)

6 to 1500 pounds. Distances from tank car to point of use can be almost any length — this is not critical. System will supply separate uses at different locations at the same time.

Without any necessity for installing insulated, refrigerated receivers for liquid carbon dioxide, Pfister located the two tank car unloading stations outside the plant and away from the work area. Track spur to shipping dock and warehouse was extended to allow space for "spotting" two cars.

Results: Pfister has no capital investment in storage tanks or unloading facilities for carbon dioxide. Tank construction would have required pilings for the tanks, because of swampy nature of ground.

System sidesteps costs of separate refrigeration and does not need any power for operation. Area normally required for storage tanks has been converted into a parking lot. Installation is serviced by supplier.

(Tank car unloader for CO₂ is patented and available from Industrial Chemicals Division, Olin-Mathieson Chemical Corporation, Dept. CP, Mathieson Bldg., Baltimore 3, Md. . . . or for more information check 9248 opposite last page.)



"Smith, the office party's under the Christmas tree in the LOBBY!"



For more information on product at left, specify 9249 . . . see information request blank opposite last page.

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Large Screening Capacity. Self-contained unit provides as much as 35 square feet of screening area in 16 square feet of floor space. Gyrotory action exposes product to all of screen cloth.

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Your Allis-Chalmers representative will be glad to tell you more about this newest and finest of gyrotory screens. Call him. Or write for descriptive Bulletin 07B8446. Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS



A-5074

When inquiring check 9250 opposite last page



Boosts Coke Oven By-product Recovery

(Continued from page 15)

The spray manifold is located at top of section just below the plate above. Six spray nozzles are used to uniformly distribute the wash oil over the tower. This produces a rain of high velocity droplets throughout the vapor zone.

Each collector plate has an overflow pipe to maintain proper liquid level. Wash oil down-flow through plates is accomplished by conventional downcomers. The downcomers extend through the plates and are sealed in pool of wash oil on the plate below to prevent gas from rising through down-flow pipes.

Results: Modified tower is handling coke oven gas at the rate of 37.5 million cfd (coking operations were expanded again) — an increase of 14% over the original *two-tower* capacity. Light oil recovery is approximately 90% — as compared to the original 75-80%. Pressure drop through the modified unit is only 4" H₂O — instead of the 16" in the old set-up. An indication of the increase in overall light oil recovery of the modified absorber as compared to the *two* spiral-packed units (for a typical month) is shown below:

| | Two Towers, Spiral-packed | One Tower, Spray-type |
|--|------------------------------|--------------------------|
| Light oil recovered, gal (Distillation 220°C) | 258,412 | 308,648 |
| Coal charged, tons | 106,410 | 105,648 |
| Recovery, gal/ton | 2.43 | 2.93 |
| Production increase, % | — | 20.2 |

Unit has given trouble-free operation. There has been no tendency for the equipment to plug or foul. The second packed tower was taken off stream shortly after the modified unit went into use. It is now maintained for stand-by duty only.

(Spray-type absorber, for which patents are pending, was developed and engineered by The Rust Engineering Company, Dept. CP, 575 Sixth Avenue, Pittsburgh 19, Pa. . . or for more information check 9251 on form opposite last page.)

Why is this magazine so "different" in . . .

- type of articles?
- how they're written?
- how they're presented?

Look for the answers on page 171

One of a series featuring various types and sizes of Chicago Pneumatic Compressors.

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• For pressures to 15,000 PSIG

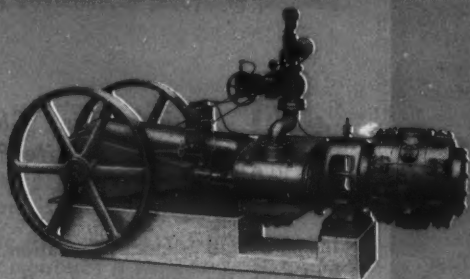
• Sizes up to 1250 H.P.



Chicago Pneumatic

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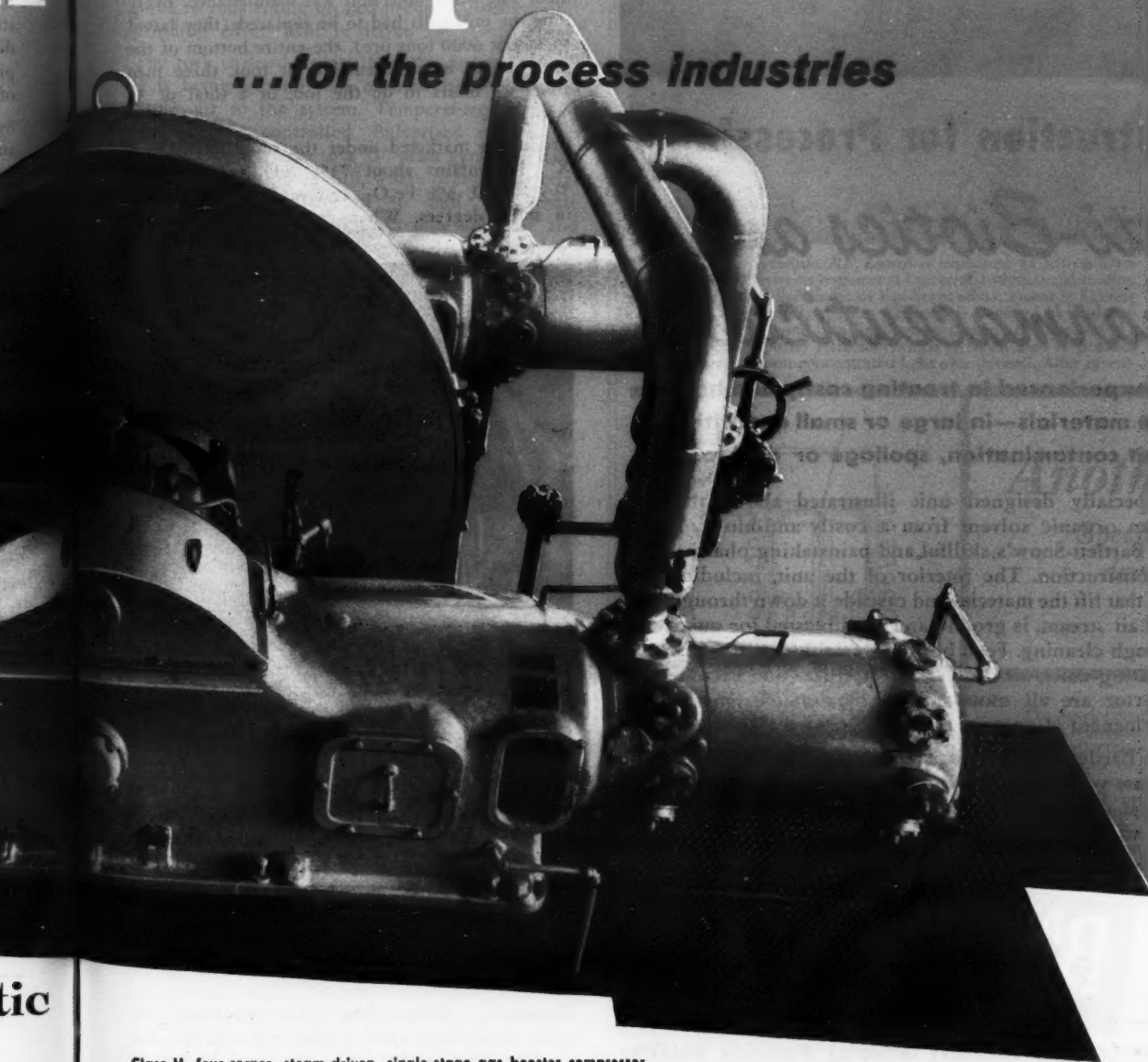
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Class H, four-corner, steam-driven, single-stage gas booster compressor.

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NEW SOLUTIONS of processing problems

Soda Ash Slurry

(Continued from page 13)

Slurry storage tank should be kept at 105°F or above to avoid formation of heptahydrate and decahydrate. Hydrates of 7 and 10 moles of water have negative heat of solution of 178 and 270 Btu/lb of Na_2CO_3 respectively, and are difficult to dissolve. Monohydrate, with a positive heat of solution of 42.5 Btu, dissolves quite easily.

When slurry in tank is allowed to drop below transition point and other hydrates are formed, monohydrates can be reformed by introduction of steam through sparging nozzles. However, because of the heat of solution, steam consumption to maintain slurry is negligible. Steam cost on a typical installation is only in the magnitude of \$150 per year, even with a winter temperature of -20°F.

Results: Savings from bulk buying of soda ash (about \$6 per ton) can pay for an unloading system and slurry storage facilities in around two years. Besides dollar savings, which figure to be several thousand dollars yearly after system has paid for itself, adoption of slurry handling has released valuable warehouse space for other uses. As system is entirely closed, no ash can enter the atmosphere and the job of housekeeping has eased considerably.

Maintenance on the slurry handling system involves only that normal for pneumatic unloading and slurry storage systems.

(System was designed by Diamond Alkali Company, Dept. CP, Cleveland 14, Ohio . . . or for more information check 9253 on form which is located opposite last page.)

DID YOU

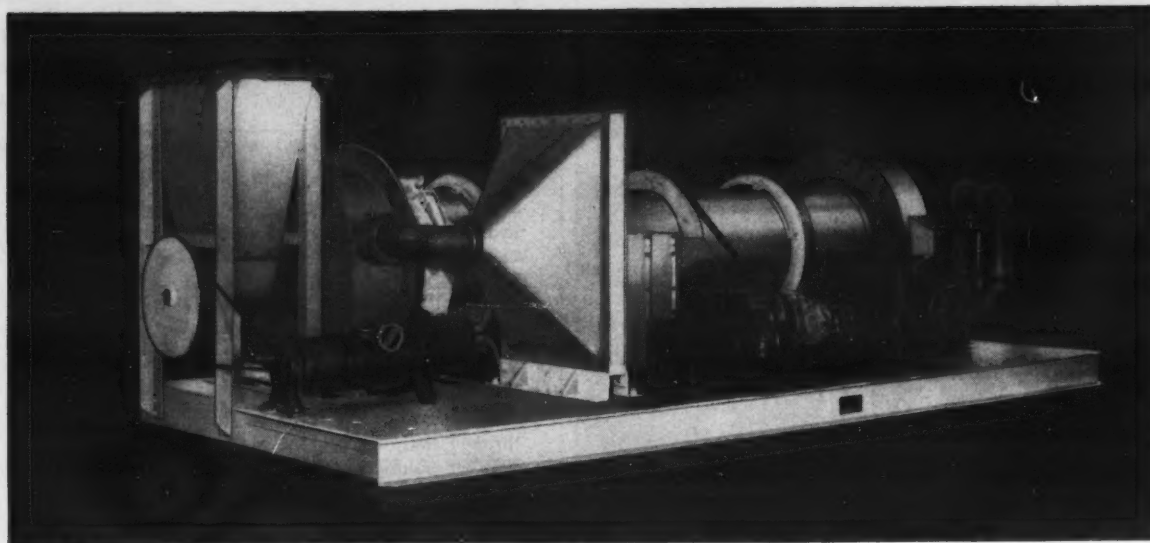
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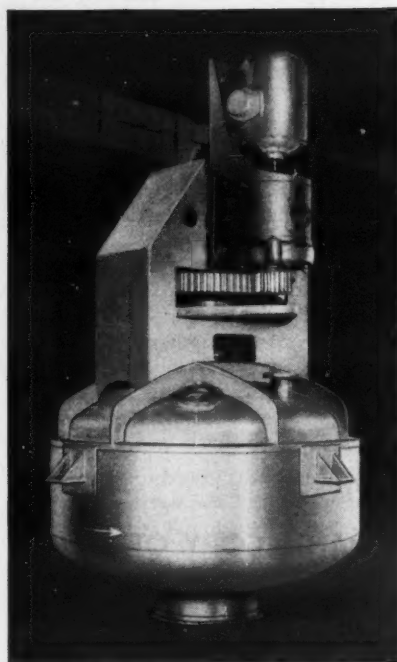
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When inquiring check 9254 opposite last page

NEW SOLUTIONS of processing problems



Grinds, Dries, Classifies— Speeds Sericite Processing

(Continued from page 10)

in the overall economic operation of the plant.

Although the conventional roll-type pulverizing equipment in the old plant had, generally speaking, given satisfactory service, it had two major drawbacks. The first was capacity. Throughput averaged only about five tons per hour, which was considered too low for the sericite ore being handled. The other objection was maintenance. Every time the mill rolls had to be replaced (they lasted for about 6000 tons ore), the entire bottom of the mill had to be disassembled. It took three men about 12 hours to do the job, or a total of 36 manhours.

Product is marketed under the trade name "Ser-X". It contains about 73% SiO_2 , 14% Al_2O_3 , 5½% K_2O , 3% Fe_2O_3 , and various other oxides in small degrees. When reduced to an average



Mill as installed in plant. Product discharged from classifier (top) is fed to collector on roof of building

particle size of 4.4 microns, the material serves as a chemically inert and relatively inexpensive filler in various industrial applications.

Solution: After a thorough investigation, company decided to install a Hardinge disc roll mill in the new plant. Originally developed by Loesche in Germany, a modified version of the machine is being produced by Hardinge Company, Inc. in

the US (there are over 800 units in operation in Europe). The unit installed at Summit can simultaneously grind, dry, and classify the product. It is said to be the first domestic application of the equipment. Here is how it works:

Crushed sericite rock (approximately $\frac{3}{4}$ " chunks, containing 5% moisture) is fed into the mill from a 30-ton feed bin (see diagram). Feed rate is automatically controlled by a volumetric drum feeder. Grinding in the mill is accomplished by two rolls riding on a horizontal disc, which rotates at relatively slow speed. Feed is deposited near center of disc and forms a shallow bed on it. Pressure applied to rolls riding on bed provides crushing and grinding effect. Mill is driven by 75-hp motor.

The rock is dried to less than 1% moisture while it is being ground. An oil-fired heater supplies 230°F air to the system. Temperature of air is automatically controlled. Pulverized material is carried by air stream to a 72"-diam gyratory classifier located on top of mill, where oversize material is rejected and returned to mill. Proper-size material is air-conveyed to cyclone collector and discharged to product storage bin, ready for bagging. Vaporized moisture is exhausted through bag-type filter.

Two improvements have been incorporated by Hardinge into the US model. The first is the gyratory classifier (trade name: "Gyrotor"). Device has a variable-speed rotor and provides extremely close particle-size control over a wide range. Second improvement is a pneumatic arrangement for controlling the roll pressure. It replaces the spring-loaded arrangement in the European model. Set-up permits easier and finer roll adjustment and results in more uniform roll pressure during operation.

Mills are also suitable for grinding relatively soft materials such as limestone, phosphate rock, bauxite, gypsum, and clays. Fineness from 20 to 325 mesh may be achieved. Widest application and fields for greatest tonnages range between 70 and 95% minus 200 mesh. Capacities run from a few hundred pounds per hour when grinding a material very fine, to 35 tons per hour for larger units grinding to medium fineness.

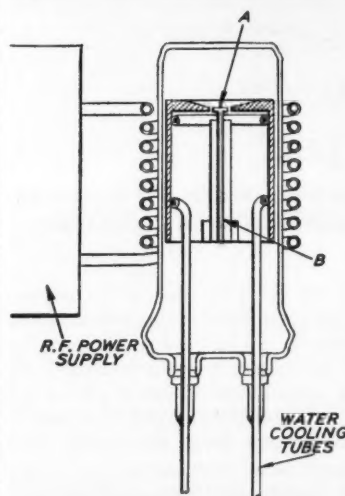
Results: Installed since May 1955, unit has been operating efficiently with minimum attention. Mill produces better product because of the more uniform particle size. In operation 24 hours a day, five days a week, unit processes as much as nine tons ore per hour — almost doubling the previous production. Roll wear is about the same as on the old equipment, but roll changing is quicker and easier. Two men do the job in about two hours, compared to the three men and 12 hours previously required — cutting downtime by 83 percent and manhour requirements by almost 90 percent. Rolls are simply swung clear of

(Please turn to next page)



The New Sylvania RF Lamp is explained to actress Dani Crayne by a Sylvania engineer at Universal-International studios, Hollywood. Called the most significant advancement in lighting since the Edison lamp, the RF lamp is powered by high-frequency radio waves. The light-emitting source is composed of a Norton high-purity refractory which Sylvania uses to produce the most uniform concentrated light ever devised. After invent-

ing this outstanding new lamp, Sylvania engineers turned to Norton Company as a dependable source of high-melting, stable materials. The commercial success of this new lamp required exact duplication of refractories from lamp to lamp. Hence, Norton experience in producing and duplicating high quality refractories gave invaluable assistance to the development of a new Sylvania product.



Norton Refractories used in the RF lamp are shown in yellow: (A) tantalum carbide target, the light-emitting source; (B) zirconium oxide target-support centers the target in the RF field. High-frequency waves from an induction heating coil pass through the glass envelope, into the concentrator, and heat the refractory target, resulting in a great increase in both volume and uniformity of light emission over the usual incandescent type lamps.

Another Norton assist...

Specially engineered refractories aid in developing Sylvania's revolutionary RF induction lamp

The development of the new Sylvania RF lamp is another good example of how Norton refractories engineers can team up with your engineering or development staff to surmount temperature barriers, provide new high-stability materials and otherwise help speed your technical progress.

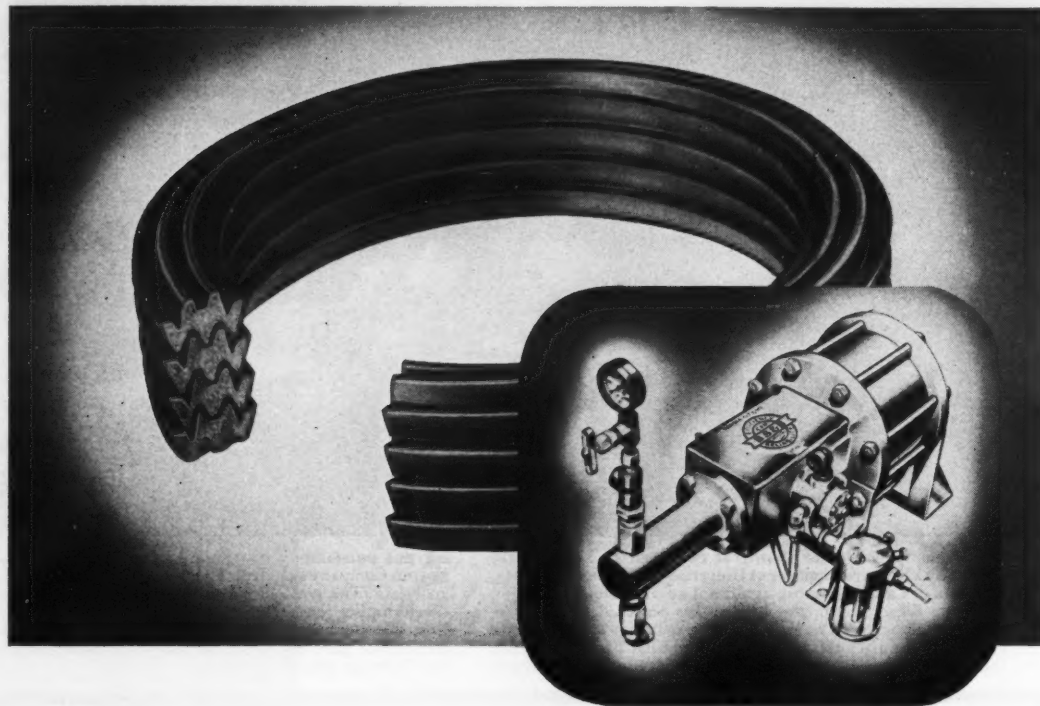
Take advantage of this cooperation. Let Norton know-how assist your program for product development or improvement. Norton high-melting, fusion-stabilized materials are *engineered and prescribed* to give you the best possible R — the most effective combination of physical characteristics plus thermal, chemical and electrical properties. For details, call in your Norton Refractories Engineer. Or write to NORTON COMPANY, Refractories Division, 571 New Bond Street, Worcester 6, Mass. In Canada: A. P. Green Fire Brick Co., Ltd., Toronto 5, Ontario.

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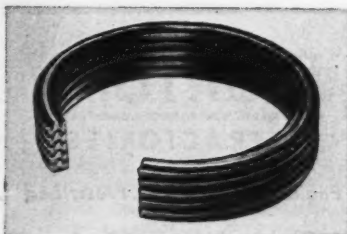
When inquiring check 9255 opposite last page

J-M Uneepac® does it again!



**"Very satisfactory sealing service
against wide variety of fluids
and pressures up to 5,500 psi"**

**says Black, Sivalls and Bryson, Inc.
makers of BS&B Glycol Pump**



Uneepac comes in two types. Shown here is design for flange widths up to 1/2" which is used in BS&B Glycol Pump. Large illustration above shows design for flange widths over 1/2".

Chalk up another success story for Uneepac—Johns-Manville's automatic ring packing. In the BS&B Glycol Pump, fluids handled include triethylene glycol, diethylene glycol, gasoline, and various types of oils, alcohols and petroleum treating chemicals. Working pressures range from 125 psi to 5,500 psi with average operating pressures at 3,000 psi. Yet despite these rugged service conditions, Uneepac has delivered—in Black, Sivalls and Bryson's own words—"very satisfactory service."

Many other packing users have acclaimed J-M Uneepac for its long, trouble-

free service. Each ring is a complete packing unit. Fewer rings are needed than ordinarily required and stuffing box size can be reduced to the minimum. Each ring centers itself automatically on the preceding ring to simplify installation. This exclusive design also permits fluid pressure to act upon each lip individually and protects lips from excessive gland pressure.

J-M Uneepac comes in a wide range of styles and sizes for many rod and plunger applications. For further information write Johns-Manville, Box 14, New York 16, N. Y. In Canada, Port Credit, Ontario.

Johns-Manville PACKINGS, GASKETS and TEXTILES



When inquiring check 9256 opposite last page

NEW SOLUTIONS of processing problems

Grinds, Dries, Classifies

(Continued from preceding page)

the mill's casing by means of a hinged-door arrangement.

Another advantage of the equipment is its versatility and low power requirements. Unit is producing four grades of materials: 92-94% 200 mesh, 93%-325, 95%-325, and 98%-325. Power cost is about 34c per ton. Fuel for air heater runs about 21c per ton. The equipment has operated so well that a second unit has been installed. Plant now has capacity of 72,000 tons a year.

(Disc roll mills are manufactured by Hardinge Company, Inc., Dept. CP, 240 Arch Street, York, Pa. . . . or for more information check 9257 on form opposite last page.)

Evaluation of activated alumina solves CH₃Cl drying problem at Polymer Corporation, Ltd.

Use of tests to evaluate the performance of desiccants prior to full-scale use can pay off in dividends. Not only can they determine optimum size, shape, service life, etc., but they can also help solve production problems.

Take the case at Polymer Corporation, Limited. One of the uses of activated alumina at the plant is for drying methyl chloride, which is the solvent in the low temperature dilute solution polymerization process for making butyl rubber. Methyl chloride and unreacted monomers are recovered by flashing with hot water and must be subsequently dried and compressed before reuse.

Two 50,000-lb capacity dryers operating on 24-hr cycle are used for this purpose. Based on previous experience, the units were designed for a drying-media service life of 12 months. Excessive pressure drop developed after six months and units had to be shut down. Investigation showed that at least half of the alumina was reduced to about 50 mesh. Water capacity of the remaining 4-8 mesh material was still 6-7%, proving that physical strength of the granules was the limiting factor.

There were other questions about the operation that the company also sought answers to. These pertained to methyl chloride losses between drying and regeneration cycle, best deactivation procedure, effect of adsorption and desorption on the desiccant, and build-up of inorganic chloride on the alumina.

To find the answers, six different alumina products were subjected to evaluation tests. Screen analysis, bulk density, water adsorptive capacity, methyl chloride hydrolysis, and isoprene polymerization tendency tests were conducted on each product. Results showed that four of the six products held

the most promise for large-scale use.

Next step was to take samples of each of the four and place them on the top and second beds of one of the production dryers. Samples were removed after six months and compared. Special attention was given to physical strength determinations. Results showed that a material made up of uniform-sized spheres was stronger after six months in the dryer than the other products were when new. Based on evaluation results, the spherical product was selected for the plant operation.

(Condensed from paper presented at the 39th Annual Conference and Exhibition of The Chemical Institute of Canada in Montreal, by A. G. Wood, Polymer Corporation Limited, Dept. CP, Sarnia, Ontario.)

**Jefferson Island Salt Company
solves wet floor problem
with wrought iron coils . . .**

metal selected because of excellent resistance to corrosives encountered

Problem: Excessive loss of product occurred due to wet floors in warehouse maintained by Jefferson Island Salt Company just west of New Orleans. Dampness caused salt to set to a rock-like hardness. High humidity in area, plus sharp temperature drops in evening, made it difficult to maintain a dry floor. Sometimes as much as 1/2" of water would be found on warehouse floor.

Solution: A few months ago, company installed a wrought-iron pipe radiant heating system. Coils of 1 1/4" pipe on 18" centers were laid on a 26x 70' portion of warehouse concrete floor. A 3" concrete covering was then poured over pipe coils. Heated water (140-180°F) passes through the wrought iron piping system.

Wrought iron pipe was selected for coils because of the long periods this material has withstood corrosion from circulating water in other installations. Also, the danger from the corrosive salt solution present at times on outside of piping made it necessary to select a material that could withstand this condition.

Results: Company reports that with the radiant heating system, humidity is being satisfactorily controlled in the salt storage areas. Floor feels warm to touch and radiates sufficient heat to evaporate moisture precipitating from saturated atmosphere. Following a rain, floor surface is dry in about 10 minutes. Loss of product during storage has been eliminated. Wrought iron pipe coils are expected to last many years.

(Wrought iron pipe is product of A. M. Byers Co., Dept. CP, Pittsburgh 22, Pa. . . or for more information check 9258 opposite last page.)

**'Sharples' brand
METHYL MERCAPTAN**
CH₃SH Synthetic

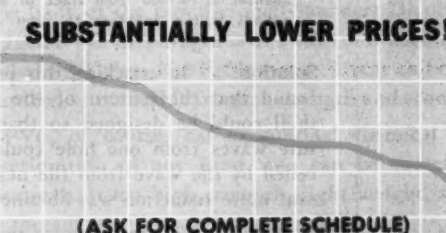


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When inquiring check 9260 opposite last page

NEW SOLUTIONS of processing problems

Noise problem solved in paper mill by use of 'comb silencer' . . .

device stops noise caused by air rushing through holes in suction rolls on paper making machine

Problem: A method of eliminating the noise produced by the suction rolls on paper machines was sought by Scott Paper Company. Rolls are used to extract water from the newly-formed wet paper web and the carrying felt. They consist of a large, rotating cylindrical shell having thousands of small holes.

The noise is caused by the rapid re-entry of air into the partially evacuated shell holes as the holes leave the suction area. A damped oscillating pressure wave is created by each hole as it "breaks" over the packing on the off-going side of the vacuum chamber. With literally thousands of holes breaking per second, the noise produced is like a siren screaming at high intensity.



Silencer is formed from stack of wedge-shape laminations bolted together to form a semi-rigid strip

Solution: In attacking this problem, engineers found that the pattern of the holes in the roll shell could be designed so that the sound pressure waves from one hole could be largely cancelled by the wave from the next hole. A significant noise reduction was obtained in this manner.

To obtain even greater noise reduction, engineers designed a comb-like packing (called a comb silencer) to replace the plain packing of the off-going side of the vacuum chamber. The silencer is designed so that each hole in the rotating shell passes over one of the wedge-like openings between the teeth of the comb. The partially evacuated hole, therefore, is not suddenly exposed to air at atmospheric pressure. Instead, the hole is gradually exposed over a relatively small air passage which controls rate of air flow into it.

The silencer was formed from a stack of wedge-shape laminations bolted together to form a semi-rigid packing strip. The laminated plastic mate-



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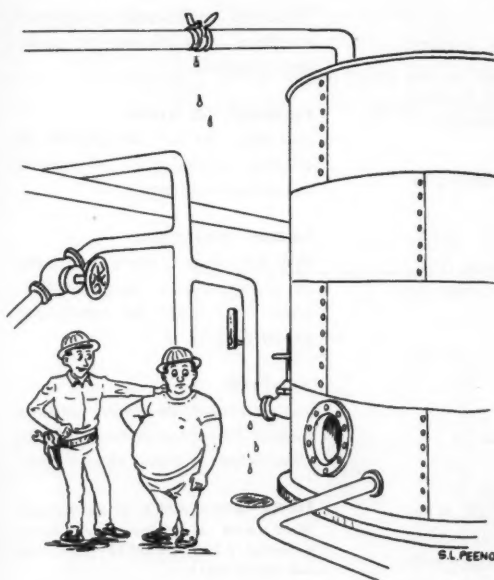
CHEMICAL PROCESSING

rial consists of a cotton fabric filler with a phenolic thermosetting resin binder. It has low water absorption, high wear resistance and machine-ability, and resists chemical attack from the "white water" drawn from the paper.

Results: Since the magnitude of the sound pressure wave created at each hole is proportional to the rate of air flow into it, the comb silencer effectively reduces the noise of the suction roll to a level below the background level prevailing in the area.

Besides reducing the noise, the comb silencer has proved its ability to stand up under severe use (roll moves over it at over 2000 fpm). It has withstood almost two years service in various paper machines without requiring servicing or replacement. Scott engineers believe that the device might also be used in other machines where similar problem exists.

(Laminated plastic was recommended by Synthane Corporation, Dept. CP, Oaks, Pennsylvania . . . or for more information reader may simply check 9262 on the convenient Reader Service slip which is located opposite last page.)

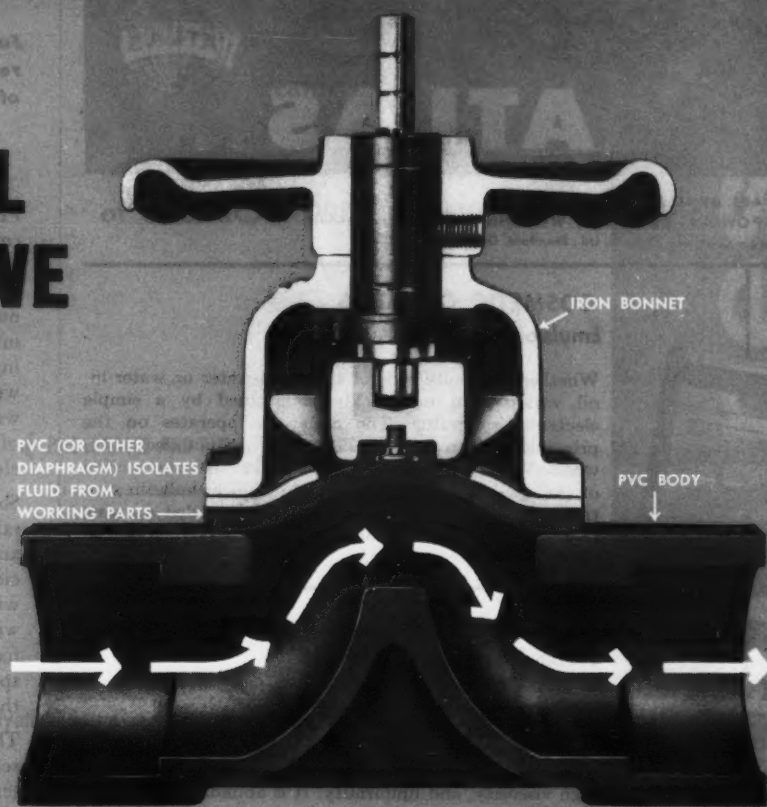


"We've got quite a problem, Charlie! That tank has to be filled and we can't find a manhole cover, so . . ."

Sherman Peeno works for Procter & Gamble, Cincinnati, O.

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The Grinnell-Saunders PVC Valve makes it practical to have a *complete* piping system — pipe, valves, and fittings — with no other material but PVC (polyvinyl chloride) coming in contact with the fluid in the line. The body of the new Grinnell-Saunders Diaphragm Valve is made of rugged PVC; diaphragm is of PVC (or a wide range of other materials, including Teflon, Kel-F, Neoprene, Hycar and others); the bonnet is of cast-iron or malleable iron for strength and economy.

PVC, of course, has exceptional chemical resistance to aging or deterioration of any kind, and can be successfully used with most chemicals. It has high strength, light weight, and can be easily joined by threading or by solvent welding.

In addition to the new Grinnell valve with PVC body and diaphragm, Grinnell offers PVC pipe in schedules 40, 80, 120; and Grinnell PVC Fittings (screwed or socket ends). Write for further information.

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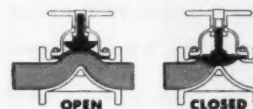
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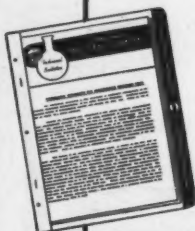
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ATLAS



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Whether an emulsion is of the oil-in-water or water-in-oil variety can be quickly determined by a simple electrical apparatus. The apparatus operates on the principle that an O/W emulsion will conduct electricity, while a W/O emulsion will not. A guide to the construction of the emulsion tester, this Atlas technical bulletin contains a parts list, wiring diagram, and detailed drawing of the completed apparatus. Check the coupon below.

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Sorbitol, a hexahydric alcohol made by Atlas from natural sugars, is widely used as a moisture stabilizer in foods, cosmetics, tobacco, and many other products. Among its properties are pleasant taste, chemical inertness, relatively high viscosity, and uniformity. It is abundant in supply, stable in price. This Atlas publication lists the principal uses of sorbitol, and provides detailed technical information on its properties. Descriptions of some sorbitol derivatives are included. Check the coupon below.

...for FOOD TECHNOLOGISTS: ATMOS® 150 ice cream emulsifier



ATMOS 150 produces a firm, dry ice cream, and can reduce emulsifier requirements by as much as a third. It is a mixture of mono- and diglycerides, combined in "optimum balance" for improved emulsification of fats and water in ice cream. This Atlas folder details the advantages of high mono ATMOS 150 and other Atlas ice cream emulsifiers. Check the coupon below.

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When inquiring check 9264 opposite last page

NEW SOLUTIONS of processing problems

Fume-proof mastic facing restores concrete walls of chemical plant . . .

no indication of deterioration five years after application of coating

Problem: At the Eastern plant of one of the country's largest chemical manufacturers, concrete walls of processing and administrative buildings were damaged by vapor attack after a period of a number of years. As moisture and stray fumes infiltrated the porous wall structure, the reinforcing iron rods slowly corroded. Although walls were not seriously damaged, sufficient pressure was built up behind concrete to spall off sections of the facing. This exposed the tie rods to raw elements and made the wall ragged and unsightly.

Solution: A bituminous compound which contains Gilsonite was applied to the walls to restore and protect them. First walls were thoroughly cleaned and severe cracks and holes were repaired with masonry material. Structure was then treated with a penetrating primer which hardened and fixed sandy areas on masonry sidewalls. Cold-sprayed bituminous mastic was then applied to a thickness of 1/16 to 1/8".

This coating consists of approximately 35% Gilsonite and asphalt by weight. Plastic-forming materials increase total solids content to 75%. Pure balanced petroleum solvents carry the base coating materials.

A single application of the coating was applied with heavy-duty spray equipment. Since the black color of mastic coatings was undesirable in this case, while the material was setting, granules of crushed gray slate were blasted into it.

Results: Wall surfaces are still in excellent condition after five years service.

(Chemical plant walls were restored by Emjay Maintenance Engineers, Dept. CP, 328 Union Ave., Rutherford, N.J. . . . or for more information check 9265 on form opposite last page.)

Tells how to use refractory cement — cites case histories

Refractory cement that resists abrasion and withstands temperatures up to 3000°F is described in illustrated eight-page color folder. Literature tells what it is, explains how to use it, and cites success stories concerning product's application in the protection of equipment against slag, fly ash, and gases.

Folder "Super #3000 Refractory Cement" is issued by Refractory & Insulation Corp., Dept. CP, 120 Wall Street, New York 5, New York. Specify 9266 on form opposite last page.



This underwater photo dramatically illustrates speedy dispersibility of new Dow Corning Antifoam B.

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CHEMICAL PROCESSING



Trends in the chemical world... what they mean to you

as reported by the editors
of **CHEMICAL PROCESSING**

◀ PHOSPHATES AND FLOUR

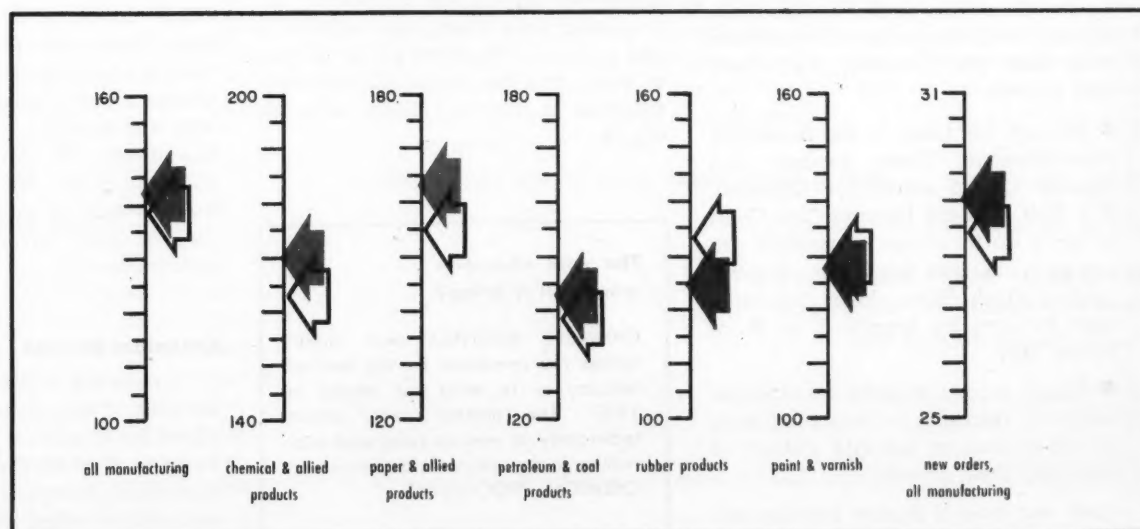
Victor executives . . . "Why don't we ask the housewife?" page 36.

- ▶ W. R. Grace acquires rights to Sequoia's Hyrad process for irradiating polyethylene, plans "active promotion throughout the world" . . . page 30.
- ▶ Trends in drugs . . . "Not an old-fashioned 'shotgun' approach," says US Food and Drug Administration's Dr. Henry Welch . . . page 30.
- ▶ Solvay Process builds with an eye to the future. New hydrogen peroxide plant aims at "stable supply so that new uses of the growth chemical can be developed with confidence of an adequate supply" . . . page 34.

chemical business INDEX

latest month

corresponding month,
1955



Production indices . . . 1947-49=100

New orders . . . in billions of dollars

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chemical business

New directions for antibiotics

Synergistic compounds — those which, when combined, produce effects greater than the sum of the two separates — will form the basis of the "third era" of antibiotics, says **Dr. Henry Welch**, director of the antibiotics division of the US Food and Drug Administration. "Current thinking shows a definite trend," says Dr. Welch, "toward combined therapy, not an old-fashioned 'shotgun approach' but a calculated method of attacking the problem of resistant organisms."

Speaking before the Fourth Annual Symposium on Antibiotics, Dr. Welch defined the first and second eras as "the era of the narrow spectrum antibiotics, penicillin and streptomycin" and "the era of broad spectrum therapy."

Example . . . Sigmamycin, from Chas. Pfizer. Produced as a companion to oleandomycin and tetracycline, the drug is reported to give protection against germs that have learned to live with older antibiotics. Recent tests on 50 cases resulted in 96 percent effectiveness as opposed to 54 percent with previously used drugs.

Other recent developments in drugs:

- Pfizer's Biostat-PA, based on broad spectrum oxytetracycline, has had some pretty impressive results in extending freshness time in such perishable foods as chicken and seafood. Drug has kept lobster fresh for over 30 days — control spoiled in about six. Equally good results have been shown with fresh pork sausage, fish fillets, and turkeys.

- And on the heels of the Biostat-PA announcement, Pfizer brought suit against Cuban distributor Ganfersa, S.A. Suit asks the Havana Civil Court to issue an injunction to prohibit unlicensed sale and distribution of tetracycline which, Pfizer claims, has been manufactured by Lepetit, S. p. A. of Milan, Italy.

- Abbott reports an experimental antibiotic — ristocetin — which appears to kill organisms outright instead of retarding their growth.

"Lab and animal studies indicate that

ristocetin is relatively non-toxic and has marked bactericidal properties," reports Abbott, "and resistance to it is not readily acquired."

Prevents and removes scale

A synergized blend of chemicals that not only inhibits scale formation in cooling and boiler waters but actually helps dissolve existing deposits of scale is described in an exclusive story starting on page 44. "It's hard to believe that this one additive does all this and is economical too," CP assistant editor **Frank McElroy** noted during his discussion with **Dr. John Singer**, one of the inventors.

"This formulation utilizes some little-known properties of its ingredients," Dr. Singer answered, "one actually synergizes the other." To verify his statements, Dr. Singer cited a number of installations in the Southwest oil-producing area where hard water is a real problem. We followed up on two of them, and the actual documentary evidence is included along with the article.

The year ahead— what will it bring?

CHEMICAL BUSINESS next month brings you comments by top men of industry as to what lies ahead in 1957. "The Leaders Speak" about technology as well as sales and economics in the major fields served by CHEMICAL PROCESSING.

Boost for irradiated polyethylene

Looks like irradiation for polyethylene is getting off the commercial ground. W. R. Grace has acquired rights to the Hyrad process for irradiating PE and is planning to "actively promote use of the process throughout the world."

Developed by Sequoia Process Corp., producer of plastic insulated wire and cable, and Stanford Research Institute, the process has heretofore been used



Electron source to be used by Grace to produce irradiated poly

only to upgrade insulating materials. Grace's plans call for exploitation in such fields as containers, coatings, and fibers.

Says Grace president, **T. T. Miller**, "Grace's acquisition of the process implements our program now underway with the building of an \$18 million high-density PE plant at Baton Rouge (CB, July, 1956). We can now combine the advantages of high-density poly, itself a great advance, with benefits of irradiation."

Zirconium furnace

. . . believed to be largest in world for melting high purity metal was completed by Allegheny Ludlum Steel Corporation at Watervliet, New York. Furnace can produce a 2200-pound ingot and has a rated capacity of 50,000

pounds per month. In addition, another furnace is already under construction by the company, embodying changes which will provide even greater capacity. When second furnace is completed by end of 1956, Allegheny Ludlum's rated capacity for production of zirconium ingots will stand at 125,000 pounds per month.

First bale of man-made rubber

... that duplicates tree rubber was produced recently in the pilot plant of Goodrich-Gulf Chemicals, Inc., at Avon Lake, Ohio. Called Ameripol SN, material has same molecular structure as crude rubber. Pilot plant production of the material will allow it to be made available shortly to other companies for testing purposes.

The new rubber has already been tested in manufacture of large truck tires. Highway service and mileage in



fleet operations have been comparable to tires made wholly of crude rubber. Goodrich announced recently that the material may also replace crude rubber as protective lining or covering against chemical corrosion.

Sidesteps tank costs

Letting a CO₂ tank car unload itself—as process demands—is possible with a patented method developed by Olin-Mathieson. First installation is at Pfister Chemical Works where tank construction would have been expensive. Swampy nature of ground required pilings. You'll find a complete description of the system and how it works in this month's New Solutions section.

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When inquiring check 9268 opposite last page

That's particularly true in filtration, where a few points higher recovery of solubles... or 5% less moisture... or 1% less impurities... soon pays back the entire cost of the filter. There's only one way to get the last ounce of efficiency: *custom designed* filtration... a FEinc specialty for 35 years.

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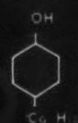
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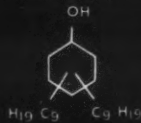
Nonylphenol



MW 220

For the manufacture of anionic and nonionic detergents, lubricating oil additives, antioxidants and petroleum demulsifiers, and for the manufacture of resinous polymers for use in protective coatings and plasticizers.

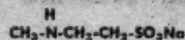
Dinonylphenol



MW 346

N-Methyltaurine 22

N-Methyltaurine 55



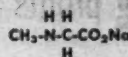
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chemical business

Dedicated to basic research

... in human, livestock, and poultry nutrition, as well as various fields of chemical research, Quaker Oats' new John Stuart Research Lab has opened its doors in Barrington (suburban Chicago), Illinois.

Named in honor of Quaker's retired board chairman (still active on the board), the three-floor plant boasts cereal and chemicals pilot plants, staff of 100.

New department at DuPont

... Elastomer Chemicals, comes into existence January 1st, will be responsible for research, production, and sales for products now handled by the elastomers division of the company's Organic Chemicals department.

Headed up by **Dr. George E. Holbrook**, the new group will make and market Du Pont's Hypalon synthetic and Hylene isocyanates as well as neoprene and rubber chemicals.

Search for specialty plastics

... and organic compounds, with exploratory studies in heavy metals, in recently-completed laboratories of J. T. Baker Chemical Company has been programmed. Endeavor is designed to develop a competitive edge for Baker in this swiftly moving field. Forty percent of Baker's present and projected research will be in new fields for the company. For many years, Baker has supplied purity reagents and chemicals, even in tonnage quantities, to industries with requirements for precision raw materials.

An acrylic resin emulsion

... called by the unassuming name of Rhoplex AC-33, has been generating a lively interest in the paint-making field these last three years since being introduced. Formulated into a water-base exterior paint, the resin gives a product with many features: Fresh surfaces dry fast and are highly resistant to rain after drying just two

hours, pretty important in the finicky Pacific Northwest weather where cloudbursts are stirred up at the drop of a MacIntosh. Besides this, paint doesn't need a primer when applied over fresh masonry, it's easy to apply quickly, and has no odor. Story on page 40, tells how British America Paint Company, Victoria, B. C., solved "a long-standing problem" by using this emulsion.

Tempo of atomic activity ... in the chemical field still increases. Here's what has been happening recently:

■ Ten of the largest US companies have formed Industrial Reactor Labs, Inc., to build and operate a privately owned nuclear reactor for industrial research. Headed up by **General Walter Bedell Smith**, (wartime chief of staff) president, and **H. L. Hilyard**, v-p, the new company's board will consist of representatives of each of the participating sponsors.

Companies involved: American Machine and Foundry, American Tobacco, Atlas Powder, Continental Can, Corning Glass, National Distillers, National Lead, RCA, Socony Mobile, and US Rubber.

■ Atlantic Refining's researchers have installed a miniature oil refinery in Brookhaven's pile in Upton, N. Y. By means of a "loop" reactor, permitting a flow of petroleum through the pile, refining conditions under the influence of radiation are simulated.

Says Atlantic v-p **Dr. H. W. Field**, "From these results we hope to be able to make a more accurate appraisal of the economic possibilities of atomic radiation in full scale petroleum refining. This effort could lead us to products not possible by any other route."

■ And from Japan ... Through irradiation techniques, scientists have lifted unplasticized PVC flow temperature from 375 to 530°F, and PVA's wet heat resistance from 240 to something like 300°F.

If it works out, Japanese fibers (as well as textiles) may well become more of a thorn in the US side.

When inquiring check 9269 opposite last page

"Penta" goes west

West Coast pentaerythritol plant with a production capacity of ten million pounds annually, plus additional facilities for producing up to 40 million pounds of formaldehyde, will be built by The Borden Company. Plant will be in Dominguez, Los Angeles County, on the same site as Borden's present synthetic resin and emulsion plant.

Until now, Borden has not been producing "penta". Borden is interested in entering this field in California because West Coast use of the chemical is increasing rapidly and West Coast users are now primarily dependent on Eastern sources. Also, "penta" integrates efficiently with Borden's formaldehyde business.

Butadiene production

... by Esso method will be boosted to more than 400,000 tons annually with completion of Orange, Texas, plant of Firestone Tire and Rubber Company. Automobile tires and rubber-based paints are furnishing impetus to butadiene production. Firestone's plant will produce 40,000 short tons annually. Nine other companies, including three outside the United States, have been licensed by Esso.



Vital protection for your products

DOW



A Report to Three Key Industries ON DOWICIDE PRESERVATIVES

New booklets for the **ADHESIVE, PAINT and VARNISH, and PAPER and FIBRE BOARD** industries give detailed product protection information

For you who are responsible for maintaining the quality of your firm's products, Dow has prepared these three information-packed booklets on the application of Dowicide® preservatives.

For adhesive—a discussion of mold growth, bacterial attack and

odor problems in starch-based, protein-derived and synthetic adhesives. For paint and varnish—factors affecting mold development, desirable characteristics of a preservative, and adding preservatives to the product. For paper and fibre board—preservatives for manufacturing operations, methods of incorporating preservatives into pulp, paper, and fibre board products.

Dowicide preservatives play equally important roles in other fields of industry—building materials, floor coverings, textiles, leather, petroleum, cosmetics and waxes, to name a few. Many firms have found that Dowicide products pay their own way by increasing production efficiency and assuring product quality.

Perhaps your products have an application for one or more of these efficient, versatile preservatives. The Dow laboratories can give you practical technical assistance on your product protection problems. For specific information on this helpful service, write today to THE DOW CHEMICAL COMPANY, Midland, Mich., Dept. DO 962D-2.

THE DOW CHEMICAL COMPANY, Dept. DO 962D-2, Midland, Michigan

Please send me a copy of the Dowicide booklet on

☐ Adhesives ☐ Paint and Varnish ☐ Paper and Fibre Board

☐ Information on my product (My product is _____)

Name _____ Firm _____

Address _____ Title _____

City _____ Zone _____ State _____

you can depend on
DOW CHEMICALS

DOW

When inquiring check 9270 opposite last page



**IT TOOK MORE THAN
AN EGGSHELL . . .**

to settle this coffee-making problem

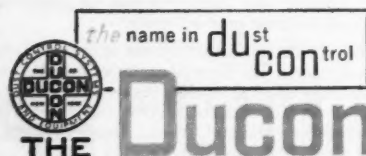
Time was when smart housewives dropped an eggshell in the pot to keep coffee grounds collected at the bottom. But the advent of modern spray drying methods has produced the "instant" beverage and made the old coffee pot just a memory.

Today, efficiency engineered Ducon Cyclone Collectors help to assure success for the coffee processor's secret of solubility. This maintenance-free equipment is providing uninterrupted service with a high degree of recovery, plus quality control for all types of spray drying applications. Minimizing particle breakage, the unit not only collects valuable fines but returns them as part of the marketable product. Like all Ducon Collectors, it is a result of the kind of engineering which has made Ducon "the name" in dust control.

There is a Ducon unit for every dust collecting problem. Send today for descriptive literature.



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TYPE SD**



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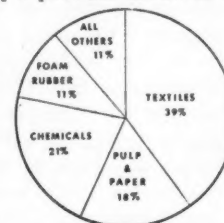
When inquiring check 9271 opposite last page

Our Growing Industry

Growth plant for growth chemical

Newly completed hydrogen peroxide plant of Solvay Process Division, Allied Chemical & Dye Corporation, at Syracuse, New York, is "growth unit" aimed at building a stable supply situation so new uses of the growth chemical may be developed with confidence of an adequate supply. Solvay's plant can be easily enlarged. This, plus additional capacity installed by other producers, will allow a continuing-upward growth curve for the already long-established chemical.

In contrast with older electrolytic method, Solvay's process involves a chemical oxidation reaction. Process was initiated by Allied Chemical's laboratory at Morristown, New Jersey, and perfected on pilot plant scale at the Syracuse research center. Involving catalytic hydrogenation and subsequent oxidation of complex organic materials, process results in combining by-product hydrogen from Solvay's adjacent electrolytic chlorine cells with oxygen from air to produce hydrogen peroxide.



H₂O₂ end use pattern

With important applications of the growth chemical continually being developed, production since 1945 has doubled every five years. Practically all cotton textiles, both knit and woven, are produced from material bleached with peroxide. Pulp and paper industry is becoming a major user of peroxides for up-grading paper. High speed propellants for military purposes use H₂O₂. The chemical is used in making foamed plastics and foam rubber, dyestuffs, plasticizers, and stabilizers for polyvinyl resins, as a polymerization catalyst in production of synthetic rubber, and in making corrosion resistant oxide coatings on metals.

Commercial production

. . . of medium density polyethylenes is expected at National Petro-Chemicals Corporation before the end of the year. High pressure production technique will be used in Petro's existing PE plant at Tuscola, Illinois, to produce these medium density products. (Technique can produce resins with a density range of 0.92 through 0.95).

At the same time, Petro is planning to increase total PE production capacity of the Tuscola plant to 100 million pounds-per-year by mid-1957. Tuscola, which came on stream in February, 1955, had a design capacity of 26 million pounds annually, but is currently operating at twice that level. Expansion of the PE plant, with attendant expansion of ethylene, extraction, fractionation, and power plants is already under way.

Reasons for industrialization

. . . of the South at present rapid pace are suggested as being manpower, markets, and materials, according to Chemstrand vice president and research director **Dr. Frank J. Soddy**. Sharp increases in per capita income, 250% since 1939, 64% above national average, has been great stimulation for construction of new plants for consumer items. Dr. Soddy, in a recent speech before American Association of Textile Chemists and Colorists, also predicted increase in production of synthetic fibers, almost entirely a southern industry, from 400 million pounds in 1955 to four billion pounds in 1975.

Latest plans for BFG Chemical

... include \$2½ million plant at Calvert City, Kentucky, to manufacture specialty acrylic polymers. **John R. Hoover**, president of the B. F. Goodrich Chemical Company, has said the new plant will be completed in October, 1957. "At that time 25 to 30 employees will be needed to operate the new facilities." Uses for specialty acrylic polymers include textile sizes, binders for foundry core sand, flocculating agents, and additives for pharmaceutical, cosmetic, and latex paint formulations. Plant will bring BFG's investment in plants and equipment at Calvert City to more than \$17 million. Present facilities include a plant for manufacture of vinyl chloride monomer and one for manufacture of acrylonitrile.

Western market demands

... for household tissue and toweling, napkins, bags, and specialty paper products has caused Crown Zellerbach Corporation to develop plans for an \$8 million plant at Antioch, California. Construction will start early next year, with startup scheduled for next summer.

Three "little" machines will make tissue (capacity, 20 tons a day) and toweling (capacity, 50 tons a day). Units will be similar to experimental machine Crown Zellerbach installed last year in Los Angeles to make consumer products for Southern California market. Special paper making process is used—the pulp is pumped against a cylindrical screen.

Automotive anti-freeze

... at rate of 12 million gallons a year will be pouring out of Olin Mathieson's formulation and packing plant in Mapleton, Illinois, by early 1958. O-M will have the plant completed in time for 1958-1959 season. Plant will be part of Industrial Chemicals Division of Olin-Mathieson which is a large basic producer of both methanol and ethylene glycol, two principal anti-freeze ingredients.



100th Anniversary

One hundred years ago, chemists August Cahours and August Wilhelm Von Hofmann published a method for producing allyl alcohol. They considered their discovery merely a laboratory curiosity and foresaw no useful applications for it.

From this humble beginning, however, allyl alcohol has grown into an adaptable

chemical, finding ever-increasing application in industry and agriculture. Today, allyl alcohol is used in the manufacture of such products as resins, weed killers and flavorings.

Shell Chemical pioneered in the production of high-purity allyl alcohol and allyl chloride. Both chemicals are avail-

able, in drum to tank-car quantities, at conveniently located Shell Chemical distribution centers.

Your Shell Chemical sales representative will be glad to help you explore the possibilities of allyl alcohol and allyl chloride in your own operations. *Write for specifications and quotations.*



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When inquiring check 9272 opposite last page

Stainless steel plus nickel alloy equals corrosion-resistance

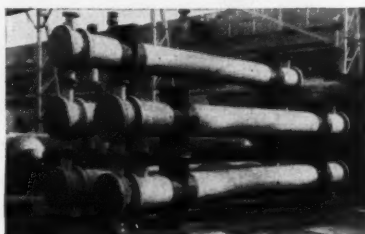


Inconel and stainless heat exchanger built for Barrett Division, Allied Chemical & Dye Corporation. Shell Diameter: 30". Tube Length: 12' 0". Tubes: 1" O.D. x 14 ga. Tube Sheet Thickness: 2". Materials: Inconel shell, tubes, tube sheets. Stainless steel heads, Type 316L.

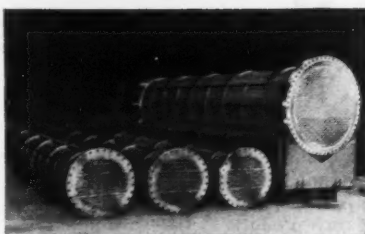
Corrosion-resistant materials a heat exchanger specialty at Downingtown

We have the engineering, welding and fabricating experience to turn out your corrosion-resistant exchangers in the materials you specify: stainless, nickel, nickel alloy, aluminum bronze, carbon and many others. Our design recommendations often save money. Send for Bulletin HE. Your engineers will find it useful.

Aluminum bronze for these five coolers saved the customer 25% on equipment costs, assured corrosion resistance. Each fixed tube sheet unit is 20" in diameter x 20' tube length. Each has 282 aluminum bronze tubes 3/4" O.D. x 12 ga. Centrifugally cast channels. Design pressure: 150 pounds per square inch on both shell and tube sides.



Stainless steel Type 304 is the material for these four tube bundles. The large one fits a 37" shell, has 1225 stainless tubes, 3/4" O.D. x 14' 0" long. Tube sheet: 2 3/4" thick. Baffles: 3/8" thick. The other three bundles are 22" in diameter; each contains 352 tubes 3/4" O.D. x 16 ga. x 12' 0" long. Tube sheets: 1 3/4" thick. Baffles: 1/4" thick. All stainless steel.



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HEAT EXCHANGERS—STEEL AND ALLOY PLATE FABRICATION
CONTAINERS AND PRESSURE VESSELS FOR GASES, LIQUIDS AND SOLIDS



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Marketing Trends

Barnstorming roadshow hits top management, gives market facts, sells Victor phosphates

Latest tool in selling industrial chemicals — consumer market research — goes to work for Victor Chemical Works to expand a 50-year old market. Victor was founded to sell phosphates to self-rising flour manufacturers. Milling industry has always been important to Victor. Now, Victor is giving help in pin-pointing markets for its consumers . . . and selling more phosphates.

First step was in focusing on present customer of self-rising flour and corn meal manufacturer. Victor's basic angle . . . the average southern housewife, living in eleven states where self-rising products are already used, is key factor in Victor's future. This woman's baking habits, opinions, desires, and true motivation will set the sales curve either up or down. But thorough study was necessary to discover what her habits really were.

Independent research organization was retained to ask right questions, in the right way, so valid answers would be assured. Investigators were local women trained in psychological interview techniques. During interviews many a housewife was turned inside out psychologically.

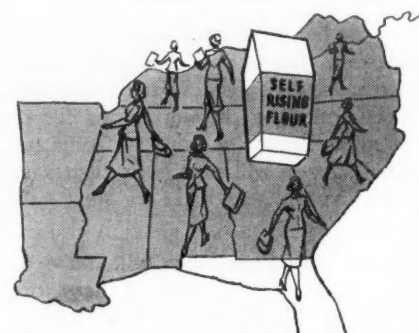
Background of market research efforts is that two-thirds of home baking in southern states are biscuits and corn bread, for which self-rising flour and self-rising corn meal can be used. Reason for motivation study was to get tip-off on sales method. Then, all angles of millers' marketing problem were examined by Victor to find out what could be done. Questions of why SRF was not being used by the housewife were pretty well answered, and Victor discovered what problems had to be solved before expanded sales curve would be felt.

Barnstorming roadshow of Victor's top sales brass presented the market data and facts in series of meetings held in four cities — Greensboro, Kansas City, Nashville, Chicago — during short period of one week. Listeners were top management people of most milling

companies selling in the eleven state area. Response of the millers — Victor's customers — was impressive.

Promotional pieces were developed for the roadshow to present facts gathered and suggest ways to use them . . . relative, of course, to Victor's phosphates.

Plus values of the study . . . its management has gained an appreciation of what kind of market Victor has, an



Victor sent research teams to probe attitudes in eleven southern states

awareness of problems customers are facing, plus answers to questions as to where company is and what will be its direction of growth.

Summing up . . . Victor is securing extended personal contact with management of milling companies, gaining knowledge of its markets from ultimate consumer.

Surface-active agents—today

Recent surveys have listed over a thousand different surface-active agents on the market. Although many of these are duplicates offered by different makers, there are still a large

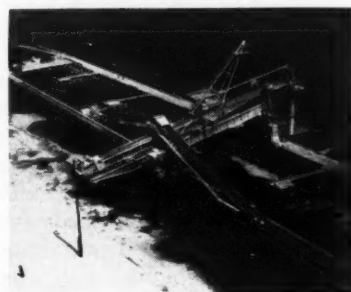
number of chemical types represented — each with its own set of physical and surface-active properties.

And this leaves the user with a considerable problem — knowing the properties, costs, and end uses of all these materials.

To help untangle all the information, **Carl Pacifico** and **M. E. Ionescu** of American Alcolac have gathered data on available materials, including production and consumption figures.

Included in the paper . . . a discussion of each end product classification, noting such things as trends and potential volumes.

For copies of the paper, check 9274 on form opposite last page.



Three quarter mile belt conveyor

. . . controlled by foot-square panel of buttons, cuts average loading time for sulphur ships and barges in half. Installed at cost of over \$1 million at Freeport Sulphur's Port Sulphur, La., operation, unit can move from one hold to another in less than five minutes — contrasted with previous half-hour necessary to move the ship.

Developed jointly by Hewitt-Robins and Freeport engineers, the loader travels over 400 feet of double rails, shuttles out 45 feet beyond the dock, can "throw" material additional 20 feet in any direction.



CRANE HOOK
6,700-lb capacity
Maximum height (hook to ground), 12'8"

WATCH THIS TRACTOR BECOME A FLEET

...and your material handling problems become a breeze

With an Allis-Chalmers HD-6G tractor shovel, you simply remove and replace four pins to change from a bulk loader to a lift fork, crane, bulldozer or ditcher. The switch takes two men less than 15 minutes, yet each new attachment can save many hours of hard labor.

With its standard 1½-yd bucket, you can stockpile, reclaim and load bulk materials of all kinds. Or you can double your speed in coal, coke, cinders and snow with a big 2¼-yd light materials bucket.

Then, by changing from one attachment to another, you handle packaged and palletized loads, move heavy machinery, level yard storage areas, maintain plant roads, landscape, dig trenches for pipe and foundation footings, handle countless other jobs—all on one basic equipment investment.

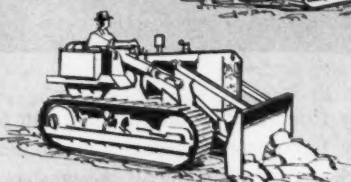
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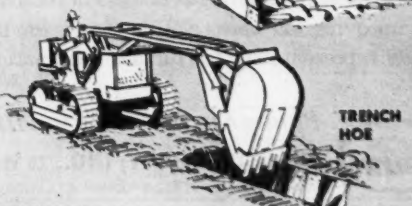
LIFT FORK
Stacking height, 9'10"
Available with fixed or adjustable line spacing



BULLDOZER or ANGLED OZER BLADES



ROCK BUCKET



TRENCH NOE

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The Enjay Company proudly invites you to inspect the new polymer wing of the Enjay Laboratories, located in Linden, N. J. Continuing the tradition of pioneering in petrochemicals, Enjay has built this new laboratory addition for application research and development exclusively in the polymer division.

With the latest technical equipment and top scientific talent, this new laboratory enables the Enjay Company to give the best possible product application service, as well as furthering Enjay's own product research program.

High speed electronic data processing equipment helps the Enjay scientists solve your compounding problems in record time. In developing new products, or improving old ones, call on Enjay for top-notch assistance. Contact your Enjay representative for further information.



Pioneer in Petrochemicals

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Enjay Butyl is the super-durable rubber with outstanding resistance to aging • abrasion • tear • chipping • cracking • ozone and corona • chemicals • gases • heat • cold • sunlight • moisture.

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chemical business

Far West hits peak

Top position, so far as level of per capita income is concerned, has been gained by Far West region of United States, replacing Middle East region which had been tops in 1929. For United States as a whole, per capita income of \$1847 in 1955 was 163% greater than in 1929. Less than half of this gain was real—rest of it being inflation. However, since all regions of the country were hit by inflation, relative growth shown is significant.

PER CAPITA INCOME IN 1955 AND PERCENT OF GROWTH SINCE 1929



Economic growth of various regions of United States, says National Association of Manufacturers, can be measured by per capita personal income of their peoples. While there is a considerable range in per capita income between regions, there has been a strong tendency for those regions with lowest per capita incomes to grow more rapidly than those above average. Lowest per capita income is still to be found in Southeast region, but this area's gain since 1929 was greatest. Since 1929, the various regions have exhibited a wide variation in income growth, but relative positions, except for the Far West's replacement of Middle East in top position, have remained the same.

Port Neches butadiene plant

... already world's largest, will be expanded 50% to 300,000 short tons annually. Plant is owned by Texas Company and U. S. Rubber Company. Full production from the new facilities is expected by late 1958. Butadiene output will be piped to two rubber producing plants adjacent to plant site.

Spotlight on People

Richard W. KixMiller, vice president in charge of the Celanese chemical division will succeed **Charles F. Beran** as director of Celanese Corporation of America. Mr. Beran is retiring after being associated with the company for 33 years.

Three new moves at DuPont are the appointments of **George H. Loving** as assistant general manager of photo products department, **Dr. William C. Kay** as assistant general manager of the organic chemical department, and **Ernest R. Bridgwater** as assistant general manager of newly created elastomer chemicals department.

At Esso . . . **O. V. Tracy** is new vice president.

American Potash & Chemical names **Dr. Donald Garrett** assistant manager of Trona, Calif., research department while **Stanley Cohen** is appointed head of company's new products section.

Dr. W. H. Schechter has been elected vice president-operations of Callery Chemicals Company.

New manager of sodium product sales at U. S. Industrial Chemicals is **Martin Faye**. **William C. Greenleaf** has been named manager of metals development for the company.

Wyandotte promotes **Lyle B. Hawkins** to technical assistant manager of new products organic chemicals department. **Dr. Kurt C. Frisch** has been appointed director of application research for the firm's research department.

James Beckett has been elected chairman of the executive committee of Interchemical Corporation and **A. Wallace Chauncey** has been elected vice chairman.

Henry H. Reichhold was elected president of Reichhold Chemicals, while **Charles J. O'Connor** was named chairman of the board and **Albert G. Goetz** its vice chairman. **Donald B. Tuson** was elected a board member.

The new prexy of Virginia-Carolina Chemical Corporation is **William H. Wilson**.

Dr. Harold J. Dawe has been appointed technical staff consultant of Acheson Industries, Inc.

Petroleum Chemicals, Inc. elects **Bruce K. Brown** to the post of president and chief executive officer.

New general development managers at Monsanto's research and engineering division are **Henry E. Wessel**, manager of marketing research and **John O. Printy**, manager of commercial development. And in Monsanto's organic chemicals division . . . **H. James Lawler** is named manager of resin materials sales while **Lloyd L. Shand** becomes manager of paper chemicals sales.

Stepan Chemical Company appoints **E. J. Black** sales manager.

Michael J. Gluck has been appointed manager of overseas operations for Nuodex Products Company, division of Heyden Chemical Corporation.

Two new members of Applied Radiation Corporation's board of directors are **Shreve M. Archer Jr.** and **Dr. George K. Nelson**.

Archer-Daniels-Midland elects **John D. Farrington** to its board of directors.

Odd-Carbon Azelaic Acid makes polyesters different!



The odd number of carbons in C_9 azelaic acid results many times in unusual properties in end products. For example, in unsaturated laminating polyesters, Emerox® Azelaic Acid results in increased flexibility and low-temperature impact resistance, both of which broaden their utility.

For all polyesters, whether they be unsaturated laminating, casting or potting types, or polyesters for urethane foams, plasticizers, or surface coatings (alkyds), Emerox Azelaic Acid offers an opportunity for unusual properties.

Likewise, in any field where dibasic acids are of interest, azelaic acid may create important differences that could lead to the development of new products or to improvements in present products.

Mail coupon below for technical bulletin describing Emerox Azelaic Acid.



Organic Chemical
Sales Department

Emerox Industries, Inc., Carew Tower, Cincinnati 2, Ohio

Emerox Industries, Inc. • Dept. CP-12, Carew Tower • Cincinnati 2, Ohio

Please send Technical Bulletin titled "Emerox Azelaic Acid."

Name _____ Title _____
Company _____
Address _____
City _____ State _____

When inquiring check 9277 opposite last page



Paint formulations are tested on these outdoor exposure racks

Roller mill is used to grind the paint formulation



Solved a long-standing problem —

high-quality masonry paints are fast drying, easy to apply

based on acrylic resin emulsion, paints can be applied
over new surfaces without a preliminary neutralizing wash

By **FRANK E. McELROY**, Assistant Editor
With **A. W. McINTYRE**, Technical Director
British America Paint Co. Ltd.
Victoria, B.C., Canada

Problem: A long-standing problem at British America Paint Company, Victoria, British Columbia, was producing an exterior paint for masonry which would perform equally well on new or old surfaces. New masonry surfaces are alkaline, while on older surfaces, aging has neutralized the lime. The climate in the Pacific northwest includes such extremes as fog and bright sunshine, subzero winds and sultry heat. These conditions test the mettle of any coating.

With conventional paints, a high pigment volume was needed to produce a flat finish for stucco surfaces. This led to early and excessive chalking and also required a prime coat so the vehicle would not be excessively absorbed by the porous masonry surface. To prevent alkalinity of new surfaces from attacking the paint, a neutralizing wash of zinc sulfate was necessary, and failure would come quickly if this wash were forgotten.

Solution: Many attempts were made to solve this problem, but none were fully satisfactory until Rhoplex AC-33, an acrylic resin emulsion having about 46% solids, was tried three years ago. British America was one of the first companies to utilize the then-new material, so an ex-

tensive testing and evaluation program was started. One typical formulation is shown in the table. The roof-top exposure racks are also illustrated.

Results: This paint, named Baprok, has found wide commercial acceptance with excellent results. The paint has been spread over new masonry without the preliminary neutralizing wash, and the surfaces show no alkali damage. Color stability has been excellent, and there has been no difficulty with premature chalking. Freshly painted surfaces dry fast, show high resistance to rain after drying periods as short as two hours. This property is important in an area where sudden cloudbursts are common at certain seasons.

Baprok
wide
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DEC

A SUGGESTED
STARTING FORMULA*

| | |
|---|-----------|
| TiO ₂ RANC | 243 lb |
| #1 Barytes | 243 |
| Snowflake Whiting CaCO ₃ | 486 |
| Tamol 731 (25%) | 19.5 |
| Diethylene Glycol | 6.5 |
| Butrol | 0.8 |
| Napco 1497-V | 3.2 |
| Water | 191.3 |
| Rhoplex AC-33 | 334.5 |
| Adjust to pH of 9.0 with NH ₄ OH | |
| 100 US gal | 1527.8 lb |

*Courtesy Rohm & Haas Co.

Baprok is easy to apply. Because it has low "drag", wide brushes can be used and the paint applied rapidly. The coating can also be rolled on or sprayed. Having no "painty" odor and being quick to dry, coating can be used at building entrances, on porches, or other such places, with a minimum of inconvenience.

Interior Paints

Interior latex paints are also made of AC-33 at British America Paint. Called Satin-Glo Latex, these water-base paints are also rapid drying and are free from objectionable odor. They are made in full line of decorator colors.

(Acrylic resin emulsion is a product of Rohm & Haas Co., Dept. CP, Washington Square, Philadelphia 5, Pa. Check 9278 opposite last page.)

Chlorates, perchlorates, MnO₂ covered in bulletins

Series of bulletins describe in detail the specs and uses of sodium and potassium chlorate, ammonium and potassium perchlorate, and manganese dioxide. These are used in pulp and paper bleaching, weed killers and defoliants, matches and fireworks, rockets and guided missiles, flares and fuses, and in battery manufacturing.

Chlorates, perchlorates, and manganese dioxide bulletins are issued by American Potash and Chemical Corp., Dept. CP, 3030 W. Sixth Street, Los Angeles 54, Calif. When inquiring check 9279 on form opposite last page.



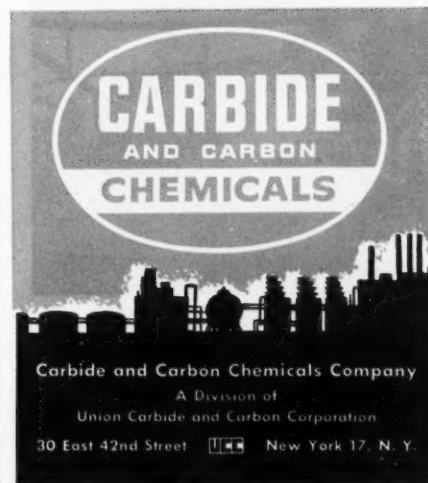
Profit from products based on...

higher vinyl esters*

- * Vinyl Propionate
- * Vinyl Butyrate
- * Vinyl 2-Ethylhexoate

These versatile monomers are available now in tank car quantities. Try them to make new and improved emulsion paints, adhesives, oil additives, and vinyl copolymers.

For information on how Higher Vinyl Esters can best serve you, write for Technical Bulletin F-8047. Offices in 26 principal cities. In Canada: Carbide Chemicals Company, Division of Union Carbide Canada Limited, Montreal and Toronto.



When inquiring check 9280 opposite last page

HOW **HERCULES** HELPS...



MODERN DESIGN—The New York Central's Aerotrain is typical of the new trains that were placed in service this year by the nation's railroads. Castings are vital to the production of such equipment and Hercules Truline® Binder helps foundries keep pace with the demand. Quick baking, Truline prevents oven bottlenecks, and Truline's easy collapsibility speeds finishing operations.

NOW IN OPERATION—At its new plant in Franklin, Va., Hercules is producing Pamak* tall oil fatty acids. These versatile chemical materials are finding ever-increasing use in printing inks, linoleum, paints, petroleum processing, disinfectants, detergents, flotation agents, and agricultural chemicals. A second plant for the production of Pamak is nearing completion at Savannah, Ga.

*HERCULES TRADEMARK



HERCULES POWDER COMPANY

940 Market St., Wilmington 99, Del. Sales Offices in Principal Cities
SYNTHETIC RESINS, CELLULOSE PRODUCTS, CHEMICAL COTTON, TERPENE CHEMICALS,
ROSIN AND ROSIN DERIVATIVES, CHLORINATED PRODUCTS, OXYCHEMICALS,
EXPLOSIVES, AND OTHER CHEMICAL PROCESSING MATERIALS.



MATERIALS

**Deactivates copper in oil products;
non-freezing, agent stays liquid
at temperatures of 0°F...**

trace copper impurities catalyze gum formation, oxidation, TEL decomposition in fuels

Uses: For deactivating traces of copper in petroleum products — in particular, gasolines and distillate fuel.

Features: Formulation will remain liquid at temperatures of 0°F and above. It is designed to eliminate the problems of freezing and low-temperature pumping which are characteristic of regular grade deactivators. Deactivator's improved solubility and pumping properties make it especially adaptable for direct injection into gasoline and other refinery streams without dilution with aromatic solvents.

Other characteristics are improved color and better solubility, particularly at lowest winter ambient temperatures.

Description: The deactivator contains as an active chelating agent a Schiff base made by condensing a hydroxy aromatic aldehyde with an alkylene diamine. It is approved for use in military fuels. The formulation contains as a solvent, a low freezing point, high solvency aromatic hydrocarbon having desirable volatility and anti-knock characteristics.

Traces of copper are often found in gasolines in concentrations of less than one ppm. They exert a strong catalytic effect on oxidation, gum formation, and tetraethyl lead decomposition. The deactivator reacts with these traces and destroys their catalytic activity.

(Copper Deactivator AW (50) is a product of Universal Oil Products Co., Dept. CP, 30 Algonquin Rd., Des Plaines, Ill. . . or for more information check 9282 on form opposite last page.)

**Provides best over-all fastness
of any line of polyester dyes
currently available . . .**

developed specifically for polyester fibers

A dye series developed specifically for polyester fibers is now available in eight colors, plus black. Evaluations made in laboratory and in commercial tests show that these dyes provide best over-all fastness properties of any line of polyester dyes currently available. Procedures recommended for handling the new dyes are those already in general use.

Dyeings can be readily accomplished in tow, tops, stock or fabric forms. Pure polyester fabrics can be conveniently dyed in jigs, while fabrics of spun polyester yarns alone or blended with cotton, vis-

HERCULES
CHEMICAL MATERIALS FOR INDUSTRY

When inquiring check 9281 opposite last page

cose, or wool can be handled in dye-becks. Pre-metalized wool dyes have been found highly satisfactory in combination with the dyes in dyeing polyester/wool-blends.

Individual dyes are as follows: Polyester Yellow W gives a bright, greenish yellow. Yellow 5R is a good low-cost yellow with excellent tinctorial value for dark brown and green shades. Red B has excellent fastness to sublimation, light, washing, wet pressing, and dry cleaning. Red 2G is a bright yellowish red that is very fast. Blue GR has low affinity for wool, is useful for coloring polyester content of polyester/wool blends.

Blue GLF has low affinity for viscose and cotton, is useful in blends. Blue 3RL is a bright red shade of blue, and makes a low-cost component for dark shades. Navy G is used for economical navies, blacks, and other dark shades. Black RB is a diazo-type of black which gives, on development, full shades of black that are fast to light and washing.

(Polyester dyes are products of Eastman Chemical Products, Inc., Sub. of Eastman Kodak Co., Dept. CP, 260 Madison Ave., New York 16, N.Y. . . . or for more information check 9283 on form opposite last page.)

**Trio of adhesives
for laminating
acetate/foil . . .**

application can be by reserve roll or gravure

Resyn 36-6254 is rubber-based, light amber, transparent adhesive for laminating cellulose acetate butyrate to foil in the production of metallic yarn. Its viscosity is 2500 cp but it can be thinned with MEK.

Resyn 76-3930 is a clear light amber liquid vinyl lacquer. "Boilable" flexible containers are being made by laminating reverse printed cellulose acetate to foil with this adhesive. Viscosity is 500 cp. To thin, use an equal mixture of isopropyl acetate and toluene.

Resyn 76-3944 is used for laminating Mylar to metallized Mylar or Mylar to foil. It is an amber, translucent rubber-base adhesive with a viscosity of about 2000 cp. Use MEK for thinning.

All three adhesives may be applied by reserve roll or gravure, and should be applied directly to the foil. Coating weight should range from 1.5 to 2.5 lb/ream. Recommended drying temp is 200-250°F with "nip" temp of 210-250°F.

(Laminating adhesives are products of National Adhesives Div., National Starch Products Inc., Dept. CP, 270 Madison Ave., New York 16, N.Y. . . . or for more information about manufacturer's product, reader may simply check 9284 on form opposite last page.)

sodium phosphates

Blockson

| | | |
|--|---|---|
| Sodium Tripolyphosphate | Trisodium Phosphate <small>CRYSTALLINE MONOHYDRATE</small> | SODIUM ACID PYROPHOSPHATE TRISODIUM PHOSPHATE CHLORINATED DISODIUM PHOSPHATE <small>ANHYDROUS • CRYSTALLINE</small> MONOSODIUM PHOSPHATE <small>ANHYDROUS • MONOHYDRATE</small> |
| Tetrasodium Pyrophosphate <small>ANHYDROUS</small> | Sodium Polyphos <small>(SODIUM HEXAMETAPHOSPHATE) (SODIUM TETRAPHOSPHATE)</small> | Blockson is also a major producer of... SULFURIC ACID SODIUM FLUORIDE SODIUM SILICOFLOURIDE HYDROFLUORIC ACID HYGRADE FERTILIZER NONIONIC SURFACTANT-TEOX® 120 |

BLOCKSON CHEMICAL COMPANY
Division of Olin Mathieson Chemical Corporation
Moline, Illinois

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PREFERRED FOR
POLISHES

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Tamms products are widely used in the polish trade, preferred for quality results.

TAMMS SILICA
Soft Amorphous Type
Grades to meet various abrasive requirements... for all kinds of metal polishes.

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Top grade, ground extremely fine... a milder abrasive than silica. Best for silver polish.

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Once-ground, double-ground and air-float... Ideal grades for buffing and polishing. Also rubbing compounds.

TAMMS BENTONITE
(Suspension Medium)
A very finely ground colloidal clay... wholly soluble. Absorbs five times its weight in water.

Write today for prices and samples.

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When inquiring check 9286 opposite last page

IT'S MORE IMPORTANT THAN YOU THINK!

An objectionable odor that may retard the sales of your finished product... or one that emanates from your plant as a part of some manufacturing process to create conditions offensive to the surrounding neighborhood — these constitute odor problems that are serious, but not insurmountable. Our years of pioneering experience in the industrial odorant field may enable us to offer you a helpful suggestion or two for the control of such problems if you have them. A letter giving us full details will bring you our prompt response.

FRITZSCHE
Brothers, Inc.

PORT AUTHORITY BUILDING, 76 NINTH AVENUE, NEW YORK 11, N. Y.
BRANCH OFFICES and STOCKS: Atlanta, Ga., Boston, Mass., Chicago, Ill., Cincinnati, O., Los Angeles, Calif., Philadelphia, Pa., San Francisco, Calif., St. Louis, Mo., Montreal and Toronto, Canada and Mexico, D. F.
FACTORY: Clifton, N. J.

When inquiring check 9287 opposite last page

materials

Treatment frees Mg and Ca from hard silica scale, leaves a soft sand deposit which removes easily (photo shows deposit after it has air dried)



Synergized chemical blend
added to cooling tower
and boiler water

inhibits scale formation, helps remove it

blend keeps hardness in solution, helps dissolve
existing scale deposits, is economical to use

Synergistic action of a chemical blend not only keeps minerals in water from precipitating and forming scale in cooling systems or boilers, but actually causes pick up of calcium and magnesium from existing scale deposits — and it does it all at low cost.

Product, called Ke-Tone, is a balanced blend of organic and inorganic chelating agents. In this patented method, EDTA (ethylenediaminetetraacetic acid) does not function primarily as a chelating agent, but rather, it is another characteristic which is important. EDTA distorts crystal growth procedures and delays the aging process on certain fine precipitates which causes agglomeration into a hard scale.

The polymerized phosphates synergize this action. If, however, they were used in higher concentrations, the polyphosphates would form calcium polyphosphate, a highly insoluble material, and actually keep

scale from going into solution.

Used in 2 to 5 ppm concentrations product dissolves calcium and magnesium from scale, bringing them into solution, where they can be removed.

Here's how this water conditioner has worked at natural gasoline plants of two major oil companies.

Cooling Tower Operation at Gulf Oil

Gulf Oil's Eunice, N.M., natural gasoline plant started using material late in 1954 in their 100,000-gal cooling system. Previously treated with a zeolite-type conditioner the water had precipitated a hard silica scale in the tower and heat exchangers.

In precipitating, silica brings down calcium and magnesium into the scale. Plant Superintendent A. E. Risinger thought he'd attack the problem from

this angle. He gave the cooling system an initial "slug" of three gal of Ke-Tone, which attacks these ions. This was followed up with additions of 1 1/4 pints of the product to the 50,000 gal of make-up water each day.

Hardness of make-up water is 4 to 6 ppm as CaCO_3 , 264 ppm as NaCl, and 80 to 86 ppm as SiO_2 . However, hardness of tower water, instead of being lower (2.3 ppm) as previously, was higher (8 ppm) as soon as treatment was started. The scale was going into solution.

Inspection was made after three weeks. A one inch water line was broken. All the hard scale was gone, and a coating of soft sand was in its place. A high pressure water jet removed it from the system. The photo shows an elbow taken from that line. The soft deposit has dried out and become powdery.

Costing around \$3.50/gal, Ke-Tone is economical. With a daily treatment cost of about 55c, savings are estimated at \$3800 a year over previous treatment. Heat transfer is better too. Temperature drop of compressed natural gas is as much as 15°F lower through some of the water coolers than before.

How Plugged Boilers were Treated at Another Compy's Plant

At the gasoline plant of another major oil company, five 180-hp boilers were completely scaled — 1/4 to 3/8 inch thick in places. Incoming water (18 gr/gal total hardness) had previously been treated with phosphates, tannin, and sulfite. Company now switched to daily addition of 1/2 to one gal Ke-Tone. For two months the boilers were allowed to "loaf," and were blown down each morning. At the end of this period, all that remained of the carbonate scale was patches that were 1/32-1/16 inch thick in some places. Four of the boilers were completely clean.

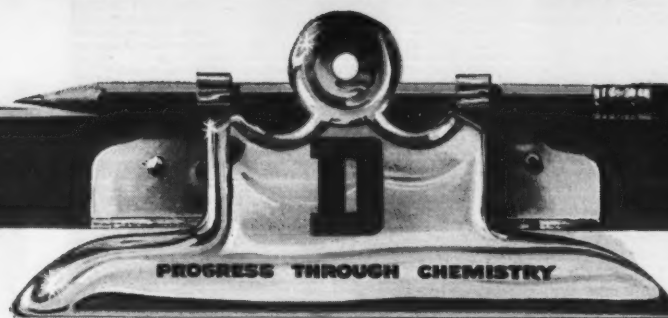
(Ke-Tone is a product of United Chemical Corp., Dept. CP, PO Box 955, Hobbs, N.M. . . . or for more information check 9288 on form opposite last page.)

(Information may also be obtained from United Chemical Corp. of New England, Dept. CP, 55 Seekonk St., Providence, R.I.)

CP's "different" format . . .

. . . helps you easily find and quickly grasp information which interests you. Sectionalization and large well-planned layouts are important. Read why . . .

. . . on page 171



Davison...leader in Silica Gel

Davison pioneered in the development of the first commercially useful silica gel more than three decades ago, and for years has been America's leading producer. Silica gel, with its porous amorphous physical structure providing a surface area of 90,000 square feet per cubic inch, is a unique compound of continuing importance and increasing application. Silica gel's most important properties are its ability to condense and retain condensable gases in the porous structure and its regenerable nature through the application of heat or other elutriation methods. A wide variety of particle sizes, densities and adsorptive capacities are available, each having been developed to meet specific application demands. Investigate Davison Silica Gel, now.

See your Davison Field Service Engineer or write for technical literature.

DAVISON CHEMICAL COMPANY

Division of W. R. Grace & Co.

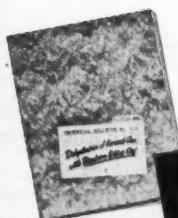
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Sales Offices: Baltimore, Md.; Chicago, Ill.; Columbus, Ohio;
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Producers of: Catalysts, Inorganic Acids, Superphosphates, Triple Superphosphates,
Phosphate Rock, Silica Gels, Silicofluorides;
Sole producers of DAVCO® Granulated Fertilizer.



ask for . . .



Davison Silica Gel
for the dehydra-
tion of air and gas.



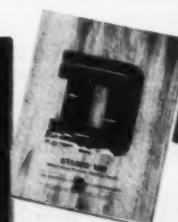
Syloid® 308 . . .
lacquer flattening
agent.



Syloid® AL-1 . . .
prevents gas build-
up in metallic paint.



Protek-Sorb® 121
. . . for Method II de-
hydrated packaging.

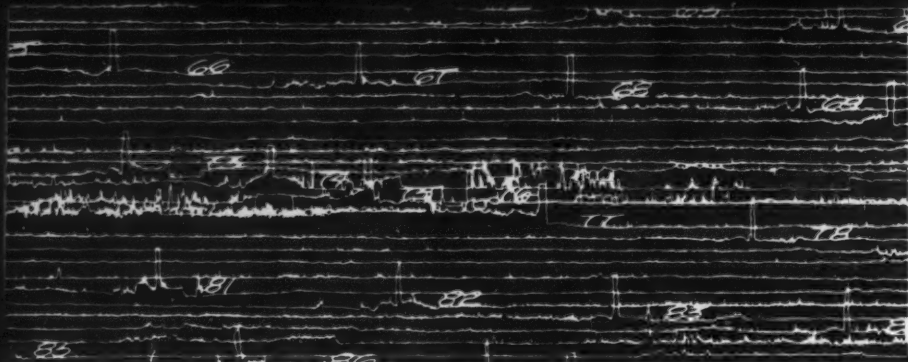


Syloid® 162 . . .
alkyd-urea varnish
flattening agent.

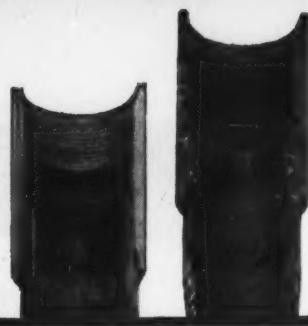


Syloid® 244 . . . superior
flattening agent in clear
alkyd finishes and
oleoresinous varnish.

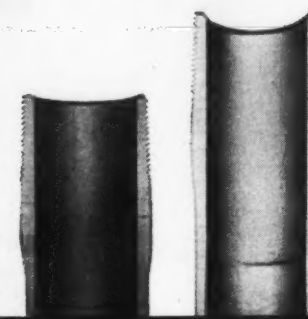
When inquiring check 9289 opposite last page



A caliper survey was made to detect corrosion of oil-well tubing. Erratic "blips" on the survey chart indicate corrosion in well using ordinary inhibitor. Parts of two corroded tubes are shown at right.



Evenly spaced "blips" in this chart show no corrosion, merely indicate tubing joints in well using inhibitor containing Sunaptic acid. The tubes look like new. Both surveys taken after one year.



Sunaptic Acid's king-size molecules give twice the efficiency of fatty, rosin, synthetic, or ordinary naphthenic acids

**USED IN CORROSION INHIBITORS, A SUNAPTIC ACID CUTS
COSTS . . . GIVES GREATER PROTECTION TO OIL WELLS**

In the above oil-well tests, the substitution of high-molecular-weight Sunaptic® acid for fatty, rosin, synthetic or ordinary naphthenic acids doubled the efficiency of the corrosion inhibitor.

The reason: the king-size molecules of Sun Oil Company's Sunaptic acid. Characteristic features of a typical molecular structure are: one carboxyl group per molecule, three saturated rings, and ring substituents of methyl, ethyl, or other aliphatic groups.

Sunaptic acids have other unusual properties: no olefinic unsaturation, high resistance to oxidative rancidity, low freezing or pour points, and a higher hydrocarbon solubility than fatty, rosin, and ordinary naphthenic acids.

Typical applications of Sunaptic acid derivatives include anti-oxidants, oil-soluble detergents, lubricant additives, plasticizers. A switch to a Sunaptic acid can possibly improve any product you're now making with fatty, rosin, synthetic, or ordinary naphthenic acids.

**For full information on Sunaptic acids and their uses, see your Sun representative, or write
SUN OIL COMPANY, Phila. 3, Pa., Dept. CP-12.**

FREE TECHNICAL BULLETINS ON OTHER SUNOCO PETROCHEMICALS

Benzene, Toluene, Mixed Xylenes • Propylene Tetramer • Propylene Trimer • PDO-40 (polymerized drying oil) • Sulfonate WS (water-soluble sulfonate) • Sulfur • Anhydrous Ammonia

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INDUSTRIAL PRODUCTS DEPARTMENT

SUN OIL COMPANY PHILA. 3, PA.

IN CANADA: SUN OIL COMPANY LIMITED, TORONTO AND MONTREAL



MATERIALS

**These inks will print
on Mylar, vinyl,
polyethylene . . .**

colors and metallics available

MY Series inks for printing on Mylar polyester film can be handled on conventional equipment. Laydown is excellent, uniformity of impressions is easily maintained. No after-treatment is needed and adhesion and abrasion resistance are excellent.

VC Series inks make possible development of "valley" or "inlay" printing on vinyl fabrics to a high degree of perfection. Properties of inks eliminate disadvantages usually associated with conventional inks.

RP Series for rotogravure printing on treated polyethylene film. Inks can be adjusted for printing with engravings of any depth and pattern. Inks give relatively static-free operation and are easy to clean up.

(Inks are products of Claremont Pigment Dispersion Corp., Dept. CP, 39 Powerhouse Rd., Roslyn Heights, L.I., N.Y. . . . or for more information check 9290 on form opposite last page.)

**Adds uniformly-labeled
phenol-C¹⁴
to line**

Phenol-C¹⁴ makes a useful tracer as synthetic intermediate in study of plant and animal chemistry and is of help in analysis of commercial products such as insecticides, medicinal, and plastics. It is available at a specific activity on 1 mc/m-mole.

(Tagged phenol is available from Nuclear Instrument & Chemical Corp., Dept., CP, 229 W. Erie St., Chicago 10, Ill. . . . or for more information check 9291 on form opposite last page.)

For more information on product at left, specify 9292 . . . see information request blank opposite last page.

Formaldehyde and hexamine are of extreme purity . . .

these products have very low metal content

Four new products from manufacturer's Danville, Pennsylvania plant are 37% formaldehyde solutions (both methanol and low methanol) and technical granular and powder forms of hexamine (hexamethylenetetramine).

Products are of relatively very high purity: maximum iron in the formaldehyde is 0.00004% and heavy metal content (as Pb) is 0.0001%; in the hexamine, heavy metal content (as Pb) is 0.02%. Other specifications are also very tight. Although the heavy metal and iron specs are the lowest in the industry, prices are competitive.

(Formaldehyde and hexamine are products of Industrial Chemicals, Merck & Co., Inc., Dept. CP, Rahway, N.J. . . . or for more information check 9293 on form opposite last page.)

Advantages of flocculating agent in pulp and paper making

Considerable savings to pulp and paper mills are possible by using a flocculating agent to reclaim what formerly had been thrown away. This 36-page bulletin tells how a flocculant is used for filler retention during sheet formation, save-alls — flotation in vacuum recovery of solids; process water; white and green liquor clarification; and bleach liquor settling and waste effluents. Description, use data, and case histories of product are included.

"Separan 2610 in the Pulp and Paper Industry" is issued by The Dow Chemical Co., Midland, Mich. When inquiring check 9294 on form opposite last page.

Chemistry of organic isocyanates

The first isocyanate was synthesized in 1849 by Wurtz, and during the more than one hundred years intervening, quite a lot of information has been found out about this class of compound. Here in this 140-page digest is summarized the present state of knowledge on the chemistry of organic isocyanates. Synthesis, reaction, and a bibliography of 176 entries are given. Ten tables, five figures, and 57 chemical reactions are illustrated.

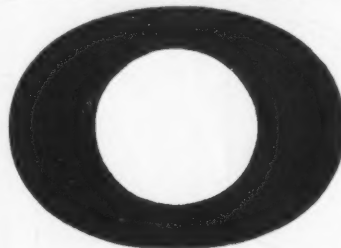
Bulletin HR-2 is issued by Elastomers Div., E.I. du Pont de Nemours & Co. (Inc.), Dept. CP, Wilmington 98, Del. When inquiring check 9295 on form opposite last page.

Oxygen doesn't always mean "life"

Eastman antioxidants are extending the useful life of products in many fields

Many products need protection against oxygen.

Lard, a typical example, turns rancid at room temperatures unless protected by the addition of an antioxidant. "Returns" and complaints of off-flavor and rancidity have long been the bane of vendors of shelled nuts. Today, thanks to the availability of an Eastman antioxidant, nut



processors can practically eliminate such complaints and greatly expand their product's distribution. The longer shelf life made possible by Eastman antioxidants, has likewise helped potato chip manufacturers broaden their selling area.

Eastman antioxidants have also helped to develop a new outlet for inedible fats and oils . . . animal feeds. Added to feed in amounts up to 4% to 5%, these fats improve the feed and represent a market of 200-300 million pounds annually. This was a totally new market for fats and helped ease a fat-surplus problem for the meat industry. Yet, it would have been impossible if antioxidants had not been available to stabilize the fat and keep the feeds fresh and palatable.

Eastman antioxidants protect many different food products, but an even broader field is covered by their use in industrial products.

In gasoline and motor fuels, antioxidants made by Eastman protect against the formation of power-robbing gum.

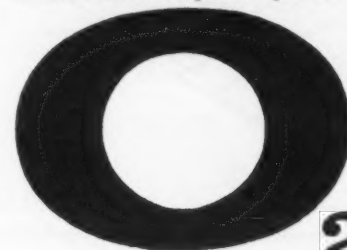
In transformer and turbine oils,

Eastman antioxidants extend service life by preventing the quick breakdown that might otherwise occur at the high working temperatures encountered.

In plastics, Eastman antioxidants help stabilize plasticizers for vinyl resins and are also used to protect polyethylene against deterioration during molding and extrusion and upon extended exposure.

In rubber, antioxidants play a well-known role in protecting against aging and heat deterioration. Rubber also needs protection against ozone — one of the most powerful oxidizing agents known. Even the minute concentration of ozone in the atmosphere can severely damage rubber products. To combat this attack, Eastman antioxidants are available.

In the agricultural field Eastman antioxidants are extending the effectiveness of such important pesticides

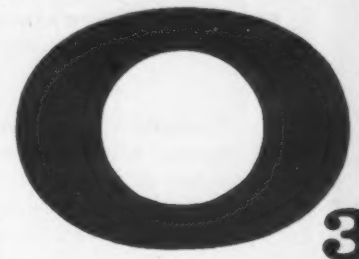


as pyrethrum. In poultry feeds other Eastman antioxidants are widely used to bring more chicks to faster and more profitable maturity by protecting vitamin content, stimulating growth, improving pigmentation, in-

creasing the utilization of Vitamin A from carotene and safeguarding chicks against such deficiency diseases as encephalomalacia.

This list could be continued to show that whenever oxygen poses a destructive threat to organic compounds there is a good chance that an Eastman antioxidant is available for effective counter measure.

Perhaps one of the many antioxidants made by Eastman could help you add life to some product you



make or use. Perhaps, as the foregoing examples illustrate, one of these antioxidants could help you combat rancidity, bad odor, off-flavor, loss of nutrient value, discoloration, embrittlement or aging.

Eastman antioxidants have helped many companies extend present markets and even develop new markets. If your product — be it food, agricultural or industrial — needs protection against oxidative deterioration, call in Eastman. Eastman's food and industrial antioxidant laboratories are staffed with specialists anxious to help you explore the benefits, the use, and the cost of antioxidants.

For more information, write to EASTMAN CHEMICAL PRODUCTS, INC., a subsidiary of Eastman Kodak Company, KINGSPORT, TENNESSEE.

Products in these fields know the value of Eastman antioxidants

| | |
|---------------------------|------------------|
| FOOD | INSECTICIDES |
| RUBBER | ANIMAL FEEDS |
| PLASTICS | HYDRAULIC FLUIDS |
| PETROLEUM | TRANSFORMER OILS |
| VEGETABLE and ANIMAL OILS | |

Eastman ANTIOXIDANTS

to combat oxidative deterioration

SALES OFFICES: Eastman Chemical Products, Inc., Kingsport, Tennessee; New York City; Framingham, Mass.; Cincinnati; Cleveland; Chicago; St. Louis; Houston. West Coast: Wilson Meyer Co., San Francisco; Los Angeles; Portland; Salt Lake City; Seattle.

When inquiring check 9296 opposite last page

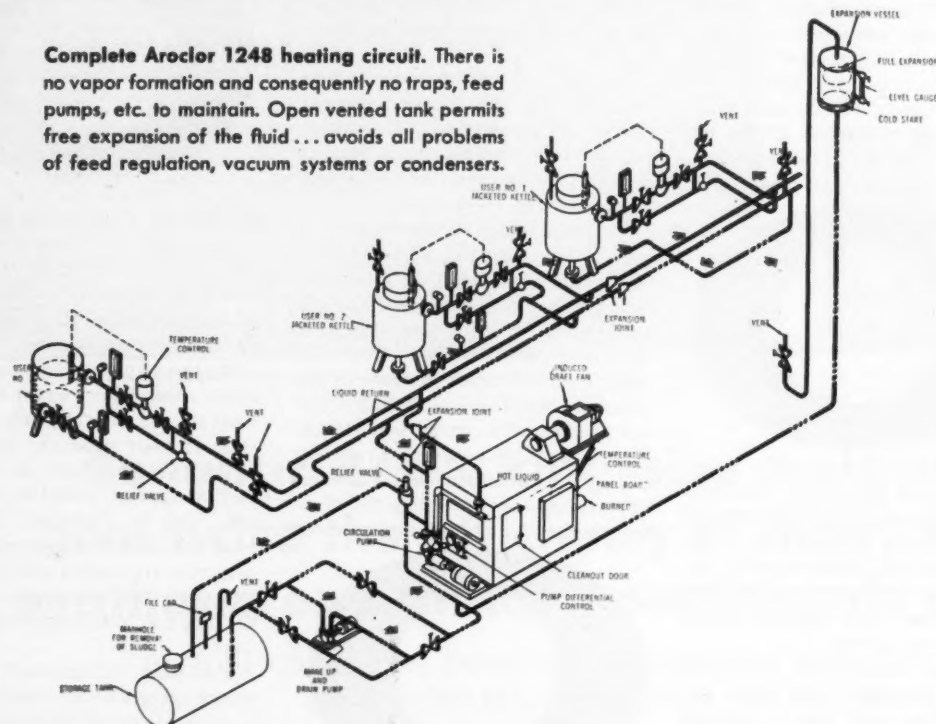
Now . . . **NON-PRESSURIZED** liquid-phase heat systems that operate up to **600°F.**

AROCLOR 1248

Operates at atmospheric pressure...cuts installation and maintenance costs of expensive pressurized systems.

Fluid is fire-resistant...increases safety by eliminating direct-firing, or heat transfer with flammable fluids.

Complete Aroclor 1248 heating circuit. There is no vapor formation and consequently no traps, feed pumps, etc. to maintain. Open vented tank permits free expansion of the fluid... avoids all problems of feed regulation, vacuum systems or condensers.



The Equipment... capacities can range from small portable units—usually electrically heated—to large gas- or oil-fired units generating from 250,000 to over 10,000,000 B.T.U.'s per hour. Circuits are closed, forced-circulation. Compact design saves space, minimizes installation and maintenance costs.

The Fluid... Aroclor 1248 is a highly stable chlorinated polyphenyl; does not support combustion up to its boiling range 652° to 725° F.; has autogenous ignition temperature of extremely high 1299° F.; is non-corrosive. Aroclor 1248 operates in most systems four to seven years without replacement.

Contact Monsanto for SOURCES of AROCLOR 1248 heating systems

Write to us on your company letterhead. We will send you technical information about Aroclor 1248 and/or the names of Aroclor 1248 heat-transfer system manufacturers and designers. Organic Chemicals Division, MONSANTO CHEMICAL COMPANY, Dept. IF-2, St. Louis 1, Missouri.

AROCLOR: Reg. U. S. Pat. Off.

MONSANTO

WORKING TOGETHER TO MAKE THE WORLD A BETTER PLACE

materials



Drops of oil won't penetrate treated fabric

A simple treatment with a fluoro-chemical makes

fabrics

res

A fluorocarbon compound applied during the fabric-finishing process makes a fabric oil-repellent and water-repellent, and therefore difficult to stain with spilled liquids (see table).

Application can be either one- or two-step and does not require additional equipment. Treatment has no visible effect on fabric's appearance and usually enhances the hand. It can be applied to wool, worsted, worsted-synthetic, and synthetic fibers. Minute quantities are required.

Treatment is not readily removed by dry cleaning. A fabric can be commercially cleaned at least five

A TABLE OF STAIN-RESISTANCE AND REMOVAL

| STAIN | UNTREATED | |
|--|------------------|----------------|
| | Stain Resistance | Stain Removal |
| FRUIT JUICES (water base, low viscosity) | FAIR | EASY |
| CATCHUP (water base, high viscosity) | POOR | MEDIUM |
| WHISKEY (alcohol-water base) | POOR | MEDIUM |
| GRASSES (oil-water emulsion, low viscosity) | POOR | DIFFICULT |
| OLIVE OIL (oil base, low viscosity) | NO RESISTANCE | VERY DIFFICULT |
| MAYONNAISE (oil base, high viscosity) | NO RESISTANCE | VERY DIFFICULT |

When inquiring check 9297 opposite last page



Oil stain penetrates this untreated fabric

resist oil-borne stains

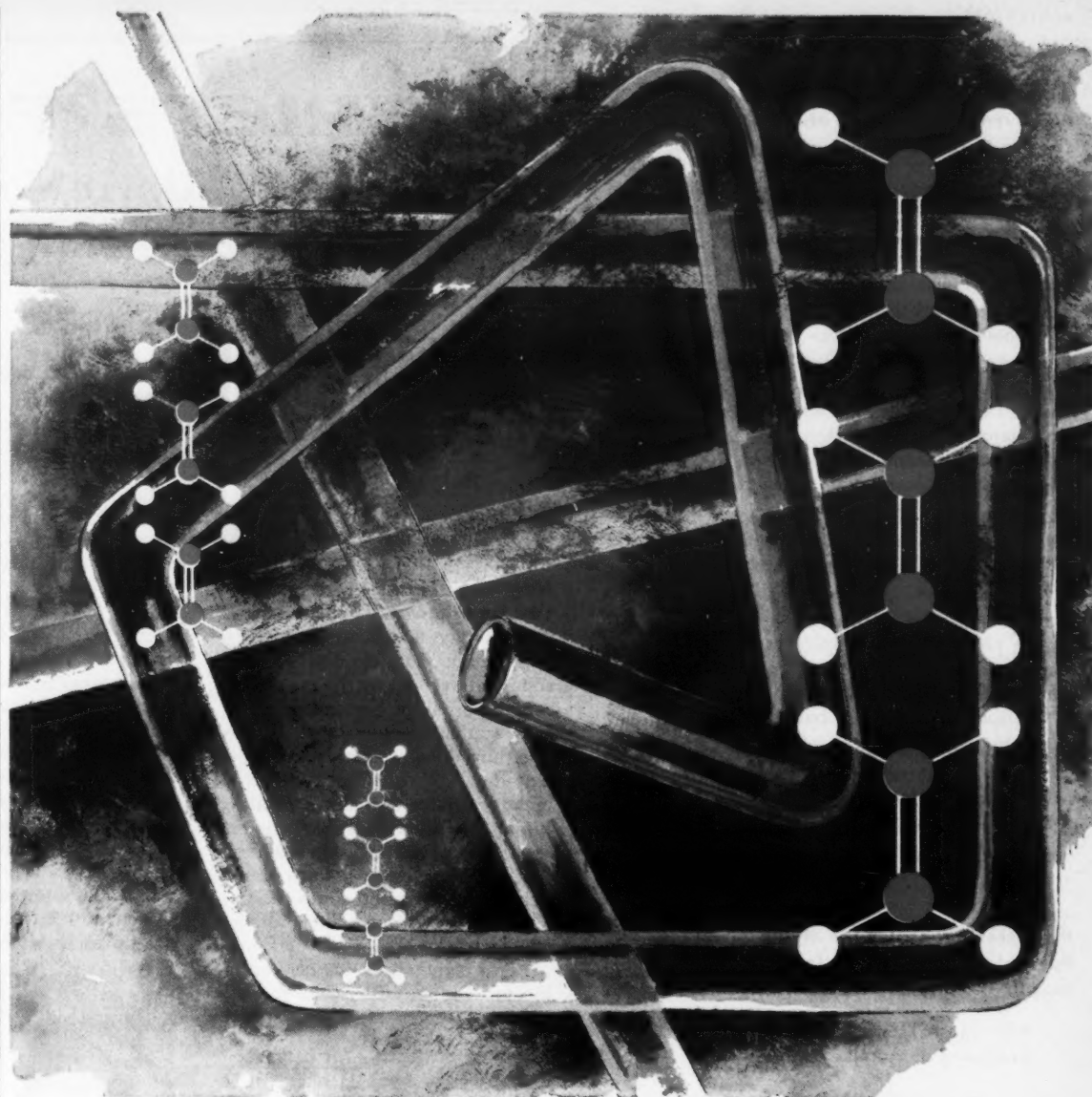
**treatment has permanence,
doesn't affect human skin**

times. Treatment has no adverse effect upon wearer's skin. First fabrics to be treated will be men's apparel and upholstering materials.

(Scotchgard textile treatment is a product of Minnesota Mining and Manufacturing Co., Dept. CP, 900 Fauquier St., St. Paul 6, Minn. . . or for more information check 9298 on form opp. last page.)

COMPARISONS ON TREATED AND UNTREATED GABARDINE

| BEST PREVIOUS TREATMENT | | "SCOTCHGARD" TEXTILE TREATMENT | |
|-------------------------|----------------|--------------------------------|---------------|
| Stain Resistance | Stain Removal | Stain Resistance | Stain Removal |
| EXCELLENT | EASY | EXCELLENT | EASY |
| GOOD | MEDIUM-EASY | EXCELLENT | EASY |
| POOR | MEDIUM | EXCELLENT | EASY |
| FAIR | DIFFICULT | EXCELLENT | MEDIUM |
| NO RESISTANCE | VERY DIFFICULT | EXCELLENT | EASY |
| NO RESISTANCE | VERY DIFFICULT | EXCELLENT | MEDIUM |



Today, pipes come out of gas!

Pipe, electrical insulation, coatings, packaging—they're all being made of Polyethylene, the fastest-growing plastic in the world. This tough, versatile polymer is produced from Ethylene gas—one of the chemical industry's basic building blocks available from Gulf. The outstanding leader in production and distribution of Ethylene—Gulf offers you a reliable source of many other petrochemical building blocks

Including: Oxo Products · Propylene · Higher Olefins · Aromatics · Sulfur

QUALITY CHEMICALS *from* PETROLEUM

When inquiring check 9299 opposite last page



PETROCHEMICALS DEPARTMENT
Gulf Oil Corporation
Gulf Building
Pittsburgh 30, Pa.

MATERIALS

Non-staining antioxidant in flake form is convenient to handle and weigh for use in rubber compounding . . .

readily compatible, agent won't bloom when compounded and won't affect cure rate

Uses: As a non-staining, non-discoloring antioxidant for use in compounding light colored natural and synthetic rubber stocks, and in rubber latex compounding.

Features: Product was developed for those who prefer an antioxidant in solid, flaked form for convenience of weighing and handling. It is readily compatible with rubbers and has shown no indication of blooming at more than double normal dosage. It does not interfere with cure rate.

Description: Nevastain B is a phenolic-type, non-staining antioxidant. Light amber in color, it melts above 55°C in a capillary tube. Sp gr (25°/25°C) is 1.137.

It is recommended for use in concentrations of 1.0 to 1.5 phr. It is as effective in performance as commercially accepted non-staining antioxidants. The compound can be readily dispersed in water. This dispersion is viscous, but stable.

(Nevastain B is a product of Neville Chemical Co. Dept. CP, Pittsburgh 25, Pa. . . or for more information reader may simply check 9300 on form opposite last page.)

Polyester adhesives for Mylar have high specific adhesion, excellent clarity, low color . . .

now in the testing stage, this group looks promising in special applications

Uses: As specialized adhesives for Mylar.

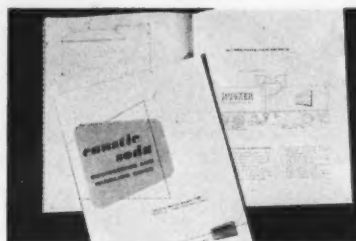
Features: These adhesives have different or superior properties to the modified synthetic rubber type and vinyl type adhesives. Polyester type adhesives have exceptional adhesion to Mylar film, possess excellent clarity and color stability, and low color and odor.

Description: This class of adhesives is chemically similar to Mylar film. They are presently in semi-works production. Although final determinations have not yet been completed, it is expected that the adhesives' lack of toxicity will permit use in food packaging applications.

Three polyester types are available. No. 4695 is the preferred adhesive in this class because of its combination of high specific adhesion for Mylar film, low viscosity at practical solids, resistance to flow at room and elevated temp, excellent color and color stability, and intermediate activation temp.

BRIEFS FOR BUYERS

about . . . Caustic Soda



New engineering guide helps you handle caustic soda safely

This 40-page Hooker manual helps you handle and store liquid caustic soda safely, efficiently, and with minimum risk of contamination.

Its contents include large, detailed diagrams of equipment; a section on materials of construction; recommendations for unloading, diluting, piping, and storage; and a section on safety precautions and first aid.

Eighteen graphs, charts, tables help you predict and control the behavior of liquid caustic soda under a wide range of operating conditions.

For a copy, check the coupon for Hooker Bulletin 102, *Caustic Soda Engineering and Handling Guide*.

Another bulletin—for buyers



Hooker Bulletin 101 is also replete with useful information on caustic soda. But this one is edited especially for the buyer.

It is pocket-sized for ready

reference. Besides data on the forms and grades of Hooker caustic soda, its contents include a list of the advantages of 50% versus 73% liquid solutions and vice versa; comparative costs; capacities of tank cars and other containers; useful shipping information.

For a copy, check the coupon for the *Caustic Soda Buyer's Guide*.

New caustic soda drum empties faster

Whether your operators scoop, pour, or shovel caustic soda from drums, they'll find our new drums easier, faster, and safer to work with.

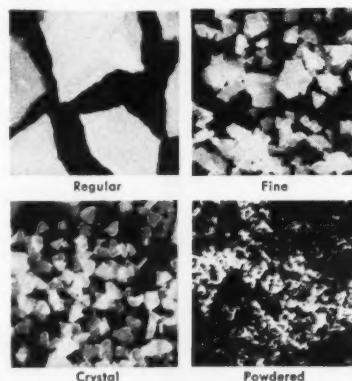
The lids on these drums have been increased from 14 to 18 inches in diameter—an increase of 65% in opening area.

You pay no extra for this new drum. So, if you've been paying a premium to get full open-head drums, you can now get many of the advantages of a larger opening at standard prices.

One thing you *won't* find changed on the Hooker drum is the lid seal. Six sturdy lugs grip the lid tightly to protect both contents and handlers.

Something else that has not changed is the quality of the caustic soda going into the drums.

You still have a choice of four flake sizes, shown actual size:



Regular, Fine, and Crystal are non-dusting and have uniform thickness. You can order the new drum in 400- and 450-pound sizes. Our 100-pound drum has a 10-inch opening.

Four versatile chloro aromatics

These Hooker aromatic compounds give you easy, practical ways of putting benzyl, benzoyl, and nitroben-

zoyl groups into organic compounds, particularly through Friedel-Crafts reactions.



Each of these compounds will undergo other reactions to produce useful products.

All four compounds are high-quality chemicals. On two of them—*meta*- and *para*-nitrobenzoyl chloride—Hooker is the only brand available in commercial quantities.

You can order as little as a 5-gallon container of these compounds, or as much as a carload.

If you'd like to know more about the specifications and physical and chemical properties of these compounds, check the coupon for technical data sheets.

Fast way to make up solutions of muriatic acid

A check mark on the coupon will bring you a technical data sheet that shows at a glance how much Hooker muriatic acid you need to make up various volumes of solutions of different strengths.

The same sheet gives some advice on the safe handling of muriatic acid, and the specifications of Hooker muriatic.

Even a quick glance at the specs is likely to convince you that the purest muriatic you can buy anywhere in volume is "Hooker White"

Chlorinated Aromatics • Muriatic Acid para-Dichlorobenzene • Chlorinated Solvents

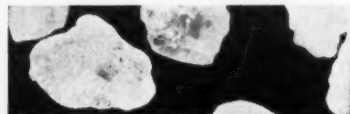
grade. Entirely free of arsenic and free chlorine, this grade contains no more than .003% sulfates, .0001% iron.

You'll discover that our commercial grade is only slightly less pure: iron, .0005%; free chlorine, a trace; sulfates, .003%; organic matter, .001%; arsenic, not a jot.

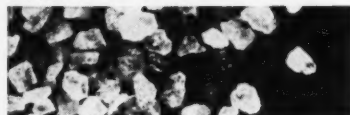
Both grades are available for your use in 13-gallon glass carboys and in rubber-lined tank cars in 18°, 20°, and 22° Baumé.

PARADI®—seeing is believing is using

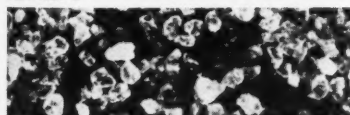
Some of our Missourian customers like to see the six different sizes of



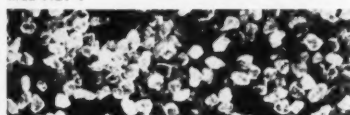
FEA NO. 1



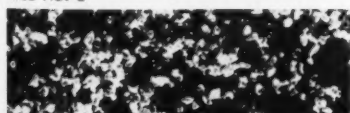
FEA NO. 2



RICE NO. 1



RICE NO. 2



RICE NO. 3



POWDERED

para-dichlorobenzene they can get when they buy from Hooker.

Hence the strips here, showing all six actual size. All six are 100% pure *para*. They're dry, non-oily; they sublime completely.

Check the coupon for a data sheet that lists complete specifications on all six sizes.

Now you can get five different chlorinated solvents from Hooker

All five of the following solvents are completely miscible with acetone, benzol, butanol, carbon tetrachloride, diethyl ether, ethylene dichloride, linseed oil, methanol, petroleum ether, Solvesso No. 2.

None are classified as flammable under ICC regulations.

ortho-Dichlorobenzene

Freezing pt.: -18° to -22°C.
Distillation range: 4°C. inc. 179.5°C.
Specific gravity (15.5°/15.5°C.): 1.313

Monochlorobenzene

Freezing pt.: -44°C.
Distillation range: 1°C. inc. 132°C.
Specific gravity (15.5°/15.5°C.): 1.113

Monochlorotoluene

Freezing pt.: below -45°C.
Distillation range: 158.3°C. to 161.7°C.
Specific gravity (15.5°/15.5°C.): 1.080

Trichlorobenzene

Freezing pt.: 10°C. Max.
Distillation range: 5°C. Max. inc. 216°C.
Specific gravity (15.5°/15.5°C.): 1.466

Nialk® Trichlorethylene

Freezing pt.: -86.4°C.
Distillation range: 86.6°C. to 87.8°C.
Specific gravity (15°/4°C.): 1.469

Cyclohexanol and Methyl Cyclohexanol: You can also get these hydrogenated solvents from Hooker in large or small quantities.

If you would like specifications and other data on these Hooker solvents, please check the coupon.

HOOKER ELECTROCHEMICAL COMPANY

412 Forty-seventh Street, Niagara Falls, N. Y.

NIAGARA FALLS • TACOMA • MONTAGUE, MICH. • NEW YORK • CHICAGO • LOS ANGELES

HOOKER
CHEMICALS
PLASTICS

663W12

For more information on chemicals mentioned here, check below:

- ☐ Caustic Soda Engineering and Handling Guide, Bulletin 102
- ☐ Caustic Soda Buyer's Guide, Bulletin 101

Data sheets:

- ☐ Caustic Soda
- ☐ Benzoyl Chloride
- ☐ Benzyl Chloride
- ☐ meta-Nitrobenzoyl Chloride
- ☐ para-Nitrobenzoyl Chloride
- ☐ Muriatic Acid

- ☐ para-Dichlorobenzene
- ☐ ortho-Dichlorobenzene
- ☐ Monochlorobenzene
- ☐ Monochlorotoluene
- ☐ Trichlorobenzene
- ☐ NIALK Trichlorethylene
- ☐ Cyclohexanol
- ☐ Methyl Cyclohexanol

Clip and mail to us with your name, title, company address. When requesting samples, please use business letterhead to help speed delivery.

No. 4696 may be of interest in certain uses where lower melting point and increased solubility are needed. It is good for low-temp applications where flexibility retention is required.

No. 4697 is a tough, flexible adhesive with high melting point. It may have particular application when block resistance of coated sheets or objects, prior to heat sealing, is of most importance. Basic polymer can be also extruded into tapes and ribbons for subsequent heat-sealing operations, thus by-passing the difficulties of handling solutions.

| | Polymer Properties | | |
|--|--------------------|---------|-----------|
| | 4695 | 4696 | 4697 |
| Melting range (°F) | 245-275 | 175-212 | 280-340 |
| Tensile strength (psi) | 3000-4000 | — | 1500-2500 |
| Peel strength (0.2-0.6 mils adhesive, lb/in) | | | |
| Myler/Myler | 6-8 | 3-5 | 4-6 |
| Myler/steel | 5.5-7.5 | 2.4 | 3-5 |
| Resistance to flow | Excellent | Poor | Fair |

| | Solution Properties | | |
|--|----------------------------|----------------|--------------------------------|
| | 4695 | 4696 | 4697 |
| Color (Parlin) | 2-3 | 4 | 4 |
| Clarity (Parlin) | 1/2-2 | 4 | 6 |
| Solids (%) | 20 ± 2 | 30 ± 2 | 18 ± 2 |
| Viscosity (#10 Parlin, sec.) | 26 | 65 ± 10 | 50 ± 10 |
| (Cps @ 77°F) | 45-70 | 200-320 | 225-345 |
| Lb/gal | 7.62 | 7.50 | 10.97 |
| Theoretical coverage at 0.5 mil dry film thickness (sq ft/gal) | | | |
| Solvents | 440 Dioxane/ ketones | 676 Ketones | 572 Chlorinated solvents |

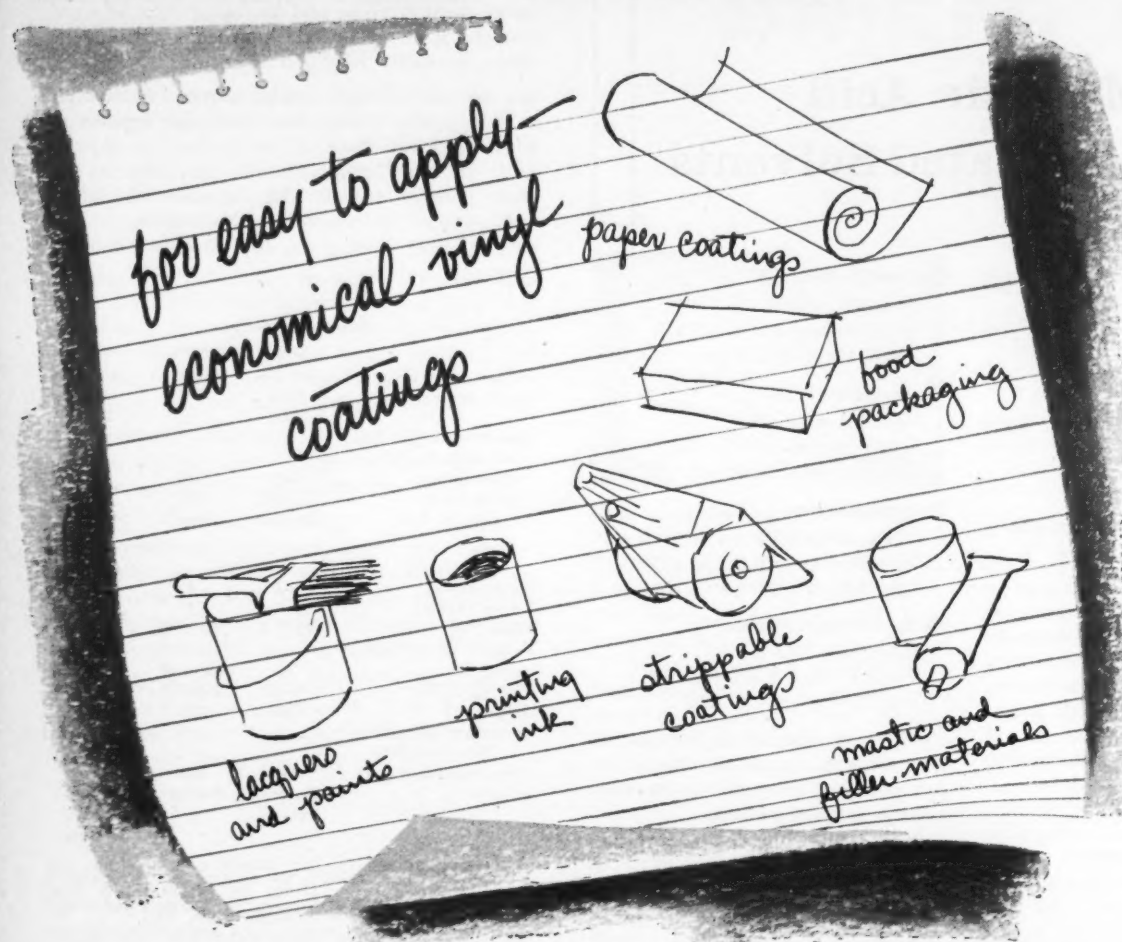
(Polyester adhesives for Mylar are products of Finishes Div., E.I. duPont de Nemours & Co. (Inc.), Dept. CP, Wilmington 98, Del. . . or for more information check 9302 opp. last page.)



"I wanted to see if you were awake in there."

When inquiring check 9301 opposite last page

B.F. Goodrich Chemical raw materials



select "tailor-made" GEON SOLUTION RESINS

YOU now have a choice of four Geon polyvinyl resins specifically designed for resin solution application—to provide thin, economical coatings on wood, glass, metal, masonry, paper, and other materials.

ADVANTAGES

- Geon solution resin coatings withstand the effects of most acids and alkalis, salt water, corrosive atmospheres.
- The coatings are odorless, tasteless, non-flammable, and constitute a good vapor barrier.
- Application is very simple and economical—the solutions adhere tightly to surfaces when sprayed,

dipped, brushed, or roll-coated.

"TAILOR-MADE" RESINS

A choice of four Geon resin materials permits matching your requirements in terms of function, desired film properties, and cost. For example:

Geon 222—completely soluble in low-cost solvents such as toluene.

Geon 427—general purpose non-reactive resin.

Geon 421—forms tough films with superior low-temperature properties.

Geon 400 x 110—excellent adhesive properties.

GET THE FACTS

A new booklet "Geon Solution

Resins" contains complete technical data and application information. For your free copy write Dept. DD-6, B. F. Goodrich Chemical Company, 3135 Euclid Ave., Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.



B.F. Goodrich Chemical Company
a division of The B.F. Goodrich Company

B.F. Goodrich

GEON polyvinyl materials • HYCAR American rubber and latex • GOOD-RITE chemicals and plasticizers • HARMON colors

When inquiring check 9303 opposite last page

MATERIALS

Three series of polyglycols offer many possibilities as intermediates . . .

production of polyurethanes, surface-active agents seen

Three groups of compounds are expected to find use in production of polyurethane and in surface-active agents. In addition, polyepichlorohydrin is also expected to be used as an intermediate in making resins and coatings. The polybutylene series should find use as chemical intermediate in making emulsifiers and demulsifiers.

Applications are foreseen in the paint, petroleum, detergent, plastic, and coating industries.

Polyepichlorohydrin, a polymer of epichlorohydrin, is a polyglycol with chloro-methyl side chains and terminal hydroxyl groups. It offers dual reactivity at either hydroxyl or chlorine sites, depending on reaction conditions. It comes in mw's of 450, 900, and 1150. It is designated Polyglycol 166.

Polystyrene glycol is made from styrene oxide and offers a high carbon-to-oxygen ratio because of its phenyl side chains. It comes in mw's of 500 and 750 and is designated Polyglycol 174. Both this and polyepichlorohydrin are hydrophobic and have high viscosity even at low mw's.

Polybutylene glycol series includes four mw's which correspond to their trade name numbers: B-500, B-1000, B-1500, and B-2000. Made from 1,2-butylene oxide and 2,3-butylene oxide, they have ethyl and methyl side chains, and have highly hydrophobic character even at low mw. They also have the highest known organic solubility of presently known polyglycols. With exception of solubility characteristics, these compounds are similar to polypropylene glycols and show promise as lubricants.

(Three Polyglycol series are products of The Dow Chemical Co., Midland, Mich. . . or for more information check 9304 opposite last page.)

Glycerine: terms and tests, properties and uses

Two digest-size bulletins supply comprehensive data about glycerine. "Glycerine Properties and Uses" is a handy reference to this compound's role in industry. Glycerine's chemistry and properties and its function in its principal industrial applications are covered. "Terms, Tests, and Technical Data" defines grades; US and British specs are given and explained, and test methods are covered in detail. Both booklets are 20 pages long and are issued by Glycerine Producers' Association, Dept. CP, 295 Madison Ave., New York 17, N.Y. When inquiring check 9305 opposite last page.

**AEC drops price
of C¹⁴ and I¹³¹**

lowered prices now set at \$22 and \$0.40 per millicurie in "bulk"

Prices have been dropped in two radioisotopes which are used widely in biological and medical research. Price of Carbon-14 is \$28 per millicurie for shipment of 199 millicuries or less; in larger shipments price is \$22 per millicurie. Iodine-131 is now \$0.50 per millicurie for shipments of 499 millicuries or less; \$0.40 per millicurie in greater amounts.

(Information courtesy Oak Ridge National Lab., Atomic Energy Commission, Oak Ridge, Tenn.)

**Charts nitroparaffins
and derivatives**

Twenty-eight nitroparaffins and derivatives are described in this chart; physical properties and uses are given. In addition, 26 other industrial chemicals are listed. Both commercial and developmental compounds are described. The folder has six pages.

"Nitroparaffins and Derivatives Chart" is issued by Commercial Solvents Corp., Dept. CP, 260 Madison Ave., New York 16, N. Y. When inquiring check 9306 on form opposite last page.

**Cement for synthetic porcelain
ceramics sets without
kiln firing . . .**

resists water, solvents, acids, heat

Uses: For making ceramic-like products for technical and industrial uses.

Features: Cement does not require kiln firing. It resists water, oil, solvents, all acids (except hydrofluoric), and temperatures to 2000°F. Its mechanical strength is about the same as that of concrete and costs are in same range as an electrical porcelain or tile body. If non-porosity is desired, cement may be impregnated with varnish or wax.

Description: Cement hardens with an internal chemical setting action. Initial set occurs in approximately 30 minutes and final complete set takes place in 6 to 12 hours at ordinary temperatures. Cement is supplied in two parts: a dry filler and a liquid binder, which are mixed together as used.

(Pour-Lay Cement No. 54 is a product of Sauereisen Cements Co., Dept. CP, Pittsburgh 15, Pa. . . or for more information check 9307 on form opposite last page.)

Arcadian[®] nitrate of soda gives you 3 extras ... at no extra cost

1. **The size you want.** Only Allied has three grades — coarse (1-C), medium (2-B) and fine (3-A). Choose the one that suits your operation, save special processing and handling.
2. **More usable material.** Crystals are solid — do not crush or create fines in handling, keep their screen sizes.
3. **Exceptional purity — 99.5%!** So pure it's used "as is" in the food and pharmaceutical industries.

Shipped from Hopewell, Va. in bulk and in 100-lb. moistureproof multiwall bags. Write for samples, quotations, literature, technical service with no obligation.

Dept. NI 1-6-1



40 Rector Street, New York 6, N. Y.

Ethanolamines • Ethylene Oxide • Ethylene Glycols • Urea • Formaldehyde • U. F. Concentrate—85 • Anhydrous Ammonia • Ammonia Liquor • Ammonium Sulfate • Sodium Nitrate • Methanol • Nitrogen Tetroxide • Nitrogen Solutions • Fertilizers & Feed Supplements

When inquiring check 9308 opposite last page

Pleasing Odor = More Sales consider resodors*!

RUBBER

A soft talc odor helps sell baby pants. A soap-fresh fragrance adds buy-appeal to shower curtains. Hand bags with a simulated leather odor have a real competitive advantage.

Perhaps an appealing odor—or freedom from objectionable odor—is just what your product needs!

SINDAR can give you expert assistance. Our RESODORS were specifically



PLASTICS

developed for use in plastics and rubber. They are easy to use—just add the oil at any convenient point in your process. They'll stand up under your temperatures too.

There's a RESODOR to give your product exactly the right odor appeal. May we send you samples and put our experience to work for you?

*Reg. U.S. Pat. Off.

SINDAR Corporation
Industrial Aromatics and Chemicals

330 West 42nd Street • New York 36, New York

When inquiring check 9309 opposite last page

What's A "New Solution"?

It's an article in **CHEMICAL PROCESSING** describing a new way of solving a tough plant operating problem. In each issue you will find specific "case histories" showing how these processing problems were solved. Each article states the operating problem . . . explains the process used and gives details of how problem was solved . . . shows results secured.

Take a look at "New Solutions" articles in this issue — they might suggest a "solution" for some of your tough processing problems.

MATERIALS

Gives synthetic fibers the advantages of natural fibers

Permanent antistatic finish is effective throughout the lifetime of the fabric

Uses: As a permanent protection against accumulation of static electric charges on all fabrics made of synthetic fibers, such as the polyamides, polyesters, vinyls, acrylics, and triacetates.

Features: When applied under optimum conditions, finish remains effective through the lifetime of a garment. After it is cured, treatment is resistant to washing with soap or detergent and to dry cleaning solvents. This finish does not impair fabric's tear or tensile strengths, or abrasion resistance. In many cases, it contributes to a full, pleasing hand.

The finish surrounds each fiber with a hydrophilic film that has the ability to conduct electricity. This prevents the fibers from accumulating static charges, from attracting dust and dirt, from clinging to the body of the wearer. Thus the treated fabric provides the advantages of a synthetic (strength, crease resistance, shape retention) with the advantages of natural fibers (moisture absorption and electrical conductivity).

Although no cost data are available, manufacturer assures us that the economics of the application will be very favorable because the concentration required is very low.

Description: Aston LT is an aqueous solution of a resin which is mixed with Aston LT catalyst in a bath. The solids ratio of resin to catalyst is from 9:1 to 8:2. Solution is padded in conventional equipment to 25-60% wet pickup at room temp, depending upon the fiber. (The amount applied ranges from 0.3 to 3.0% solids on weight of fabric.)

The resin is further polymerized by curing 2-15' at 350°-210°F, depending upon the fiber. After cure, finish is insoluble, tough, and flexible. Although finish is very durable, there is no chemical bond between it and the fiber.

As product is still undergoing long term evaluations, manufacturer wants to give technical supervision to all new applications. The following information is included to give some specific details on how the finish is used.

| | Aston LT | Aston LT catalyst |
|----------------------|-------------|----------------------|
| Appearance of liquid | clear | viscous |
| Activity (%) | 20 | red |
| Density (gm @ 25°C) | 1.05 | 90 |
| pH | 8-9 | 1.38 |

Your guarantee of
PURITY
SERVICE
UNIFORMITY



COCONUT OIL
FATTY ACIDS &
METHYL ESTERS

| FATTY ACIDS | | |
|---------------|----------|-----------|
| Caprylic | Eldhyco* | Capric |
| Lauric | Coconut | Myristic |
| | Palmitic | |
| METHYL ESTERS | | |
| Caprylate | Eldo 18* | Caprate |
| Laurate | Coconate | Myristate |
| Caproate | | Palmitate |
| *T. M. Reg. | | |

For example:

ELDO CAPRIC ACID

94-97% pure. Readily available at an attractive price. Eldo's high standards give you a better, more uniform end product.

For samples and specifications, write Dept. P



P. O. Box 599, Oakland 4, California

In Chicago: M. B. Sweet Co. Howard Deck
In Cincinnati: In Detroit: H. Reisman Corp. Harry Holland & Son, Inc.
In Cleveland: F. W. Kamin Co.

When inquiring check 9310
opposite last page

CHEMICAL PROCESSING

MATERIALS

Bath pH is held between 8 and 11, although the resin has excellent stability to acid or alkali. After padding and cure, fabric is given an afterwash at 90°-110°F, with 0.1% detergent.

Typical Application to Nylon Fabric

For example, a nylon taffeta fabric was padded to 40% wet pickup at room temp, frame dried, cured for 15 minutes at 210°F and afterwashed in 0.1% Neutronyx 600 detergent. Composition of pad liquor:

| | % wt |
|-------------------------|------------|
| Aston LT (20%) | 32.0 |
| Aston LT Catalyst (90%) | 1.75 |
| Caustic soda | (to pH 11) |

The specific area resistance (@ 40% RH) of the treated nylon after 20 washings was 8×10^{10} ohms. The original untreated nylon had a resistance greater than 2×10^{14} ohms. Similar decreases in resistance are noted for Dacron and Orlon.

(Permanent antistatic finish for synthetics is a development of Onyx Oil & Chemical Co., Dept. CP, Warren & Morris Sts., Jersey City, N.J. . . . or check 9311 opposite last page.)

Releases photostats of four Natta olefin polymerization patents

Four recently authorized Irish patents give a very thorough and up-to-date account of the processes used in making isotactic polymers of olefins and diolefins by the so-called Natta technique. These patents, No. 33855, 39955, 42555, and 66855, are believed to be more comprehensive and thorough than any Italian or Belgian patents issued to Professor Ziegler or the Montecatini Co. An added advantage is that these patents are in the English language.

Photostats of the patents are available for a charge direct from Chemonomics, Inc., an Affiliate of R.S. Aries & Associates, Dept. CP, 270 Park Ave., New York 17, N.Y. Further information about the photostats may be obtained by checking 9312 on form opposite last page.

System for bonding Teflon explained in bul trio

Three bulletins discuss bondable tetrafluoroethylene products, Teflon and Rulon skived tape, and a one-part adhesive for Teflon and Rulon. Bulletins have nine, five, and two pages respectively.

Teflon and Rulon reports are issued by Dixon Corporation, Dept. CP, Bristol, R.I. When inquiring check 9313 on form opposite last page.



You'll Reduce Costs
4 Ways When You Order
PITTSBURGH MOLTEN PHTHALIC!

USERS of phthalic anhydride in flake form specify *Pittsburgh* because they like the uniform quality, reliable deliveries and the convenience of *Pittsburgh* "Quick-Open" bags. But if you have facilities for receiving tank truck or tank car shipments of *Pittsburgh* Phthalic Anhydride in molten form, you'll enjoy these important cost-saving advantages, too:

1. Lower cost-per-pound.
2. Lower handling costs.
3. Less warehousing and inventory space.
4. Reduced processing time.

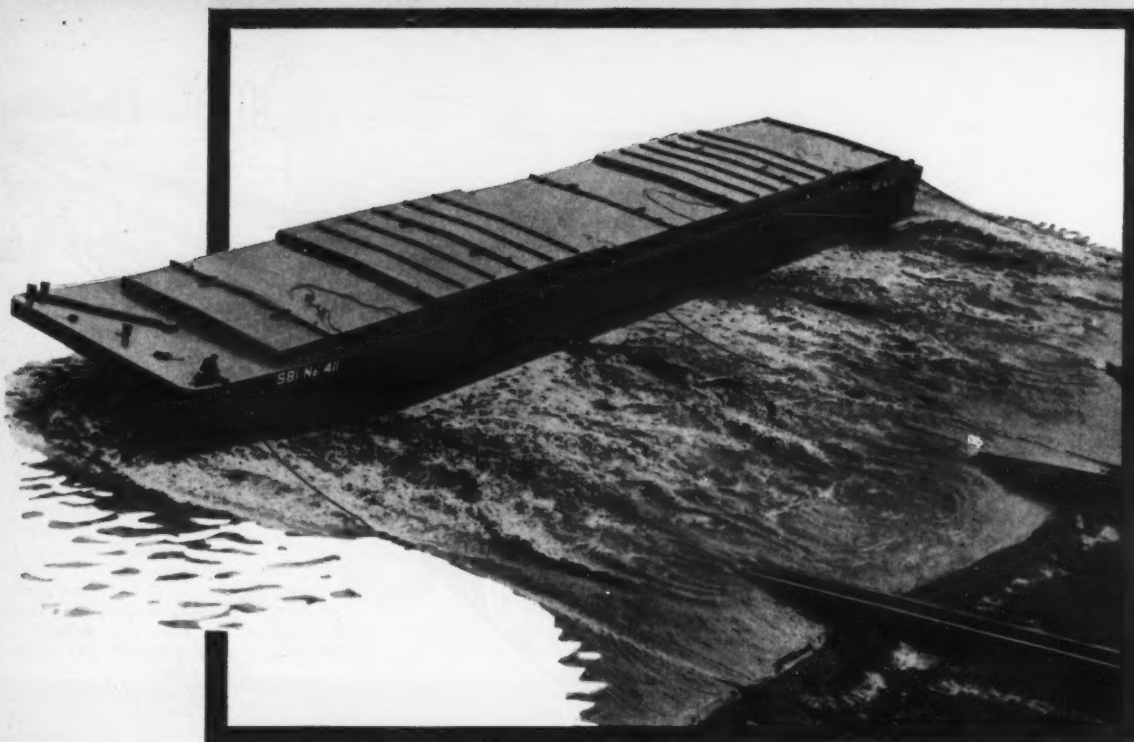
And remember: *Pittsburgh* is doubling its phthalic output this year . . . greater assurance than ever of prompt deliveries in any quantity when you buy from basic *Pittsburgh*!



WSW 6016

COAL CHEMICALS • PROTECTIVE COATINGS • PLASTICIZERS • ACTIVATED CARBON • COKE • CEMENT • PIG IRON

When inquiring check 9314 opposite last page



Joining the Olin Mathieson fleet

Here is one of the six new 1400-ton barges which will serve users of Mathieson chemicals. These 195-foot, all-steel barges are weather tight; the rolling hatch covers can be moved to expose 50% of the hold for easier loading and unloading.

The efficient use of water, rail and highway transportation helps customers get the full benefit of Olin Mathieson's multi-plant facilities. Whether you order by barge, car, truck, or drum, Olin Mathieson's experience with the logistics of the chemical process industries will enable you to buy to better advantage. Call your Olin Mathieson representative for complete information.



MATHIESON CHEMICALS
OLIN MATHIESON CHEMICAL CORPORATION
INDUSTRIAL CHEMICALS DIVISION • BALTIMORE 3, MD.

INORGANIC CHEMICALS: Ammonia • Bicarbonate of Soda • Carbon Dioxide • Caustic Potash • Caustic Soda • Chlorine • Hydrazine and Derivatives • Hypochlorite Products • Muriatic Acid • Nitrate of Soda • Nitric Acid • Soda Ash • Sodium Chlorite Products • Sulphate of Alumina • Sulphur (Processed) • Sulphuric Acid

ORGANIC CHEMICALS: Ethylene Oxide • Ethylene Glycols • Polyethylene Glycols • Glycol Ether Solvents • Ethylene Dichloride • Dichloroethylene • Formaldehyde • Methanol • Sodium Methylate • Hexamine • Ethylene Diamine • Polyamines • Ethanolamines • Trichlorobenzene • Polychlorobenzene • Trichlorophenol

When inquiring check 9315 opposite last page

MATERIALS

Synthetic fiber development combines versatile dyeing with synthetics' advantages

A staple, fiber has dyeing characteristics of the cellulose

Uses: Fiber will be of interest to manufacturers of most classes of textile goods: apparel, household, and industrial fabrics.

Features: Here in one fiber are combined the ease-of-care properties of a synthetic with the versatile dyeing characteristics of cellulose fibers such as cotton and rayon. The fiber has good initial whiteness and good bleachability. Wear resistance and resistance to rot and chemicals are high. Free from serious pilling tendencies, the fiber has excellent dimensional stability when exposed to elevated temperatures.

Description: Called Zefran, the fiber has been in development for over five years. Although the exact chemical nature of the material is being kept a secret, most indications are that it contains vinyl pyrrolidone (see *CHEMICAL PROCESSING*, Feb 1955, pp 32-34).

Average Properties of Zefran

| | |
|---|----------------|
| Tenacity (gm/d) | |
| dry* | 3.5 |
| wet | 3.1 |
| Elongation (%) | |
| dry* | 33 |
| wet | 33 |
| Yield (gm/d)* | 0.98 |
| Loop tenacity (gm/d)* | 1.4 |
| Cross-section | round |
| Initial color | white |
| Sp gr | 1.19 |
| Moisture regain* | 2.5 |
| Refractive index | 1.5115 |
| Flammability (depends upon fabric geometry) (AATCC) | Class 1 Normal |
| Recovery behavior | good |

*At 70°F and 65% RH

Zefran will be available in forms (staple length, denier, crimp, etc.) suitable for economical and efficient processing by common textile processing systems and for blending with other fibers. Construction of a manufacturing plant on a 600 acre site near Lee Hall, Virginia, should be completed in 18 months.

(Zefran fiber is a product of The Dow Chemical Co., Midland, Mich. . . or for more information check 9316 on the convenient Reader Service slip which is located opposite last page.)

**Thickens polar, non-polar compounds,
is chemically non-reactive
and stable**

Uses: For thickening paints, varnishes, protective finishes, plastics, printing inks, cosmetics.

Features: Ability to body organic liquids is not affected by impurities such as water, phenols, polar solvents or slightly basic or acidic components. Thickener maintains uniform viscosity over long periods of aging, as it is stable and chemically non-reactive.

Thickener increases and controls viscosity, controls sagging and flow, prevents pigment settling, improves brushability, controls penetration, and provides better leveling characteristics. It will not affect rate of drying, scratch resistance, adhesion, color, or gloss of finish.

Description: Thixotropic bodying agent is a finely-divided white organic powder that is practically odorless and tasteless. Sp gr is 0.980 and melting point is 86°C. Bulking value is 0.33 gal/lb.

In paints, best effects are achieved by adding agent to the pigment grind. The amount will vary according to the paint system and effectiveness of grinding method, but a concentration of 2-3 lb/100 gal paint is recommended as a start.

(Viscotrol-A is a product of Ferro Chemical Corp., Dept. CP, PO Box 349, Bedford, Ohio . . . or for more information check 9318 opposite last page.)

Fatty alcohol data sheet

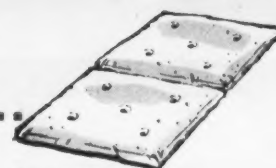
Data sheet lists properties, purities, and availability of grades of C12 to C18 straight-chain fatty aliphatic alcohols.

"Cachalot Fatty Alcohols" is issued by M. Michel and Co., Dept. CP, 90 Broad St., New York 4, N.Y. Specify 9319 opposite last page.

What's ahead for business and technology in 1957?

In next month's issue, top leaders of the chemical processing industries peer into the future and tell what they see for the year ahead. Dealing with technology as well as sales and economics in the major fields served by CHEMICAL PROCESSING, "The Leaders Speak" feature will appear in January's CHEMICAL BUSINESS section.

Biscuit baking...



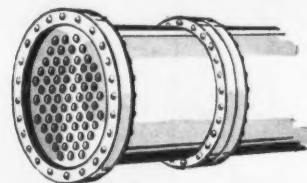
Leavening

leather tanning...



Neutralizing

gypsum removal...



Scale removal

each uses a different property of

SOLVAY AMMONIUM BICARBONATE

WHICH OF THESE PROPERTIES CAN YOU USE? Physical and Chemical Properties

Molecular Weight: 79.06

Solubility in Water: 14% at 10°C., 17.4% at 20°C., and 21.3% at 30°C.—Insoluble in alcohol.

Negative heat of solution

Stability: Relatively stable at room temperatures.

Volatility increases sharply above 140°F.

Decomposition product ratios are as follows:

Ammonia gas (NH₃).....21.5%

Carbon dioxide gas (CO₂).....55.7%

Water vapor (H₂O).....22.8%

pH of 1/10 N solution at 25°C.: 7.8

Appearance: White Crystals

Quality: Exceptionally pure. Food grade.

Very low metal content.

The leavening of thin-baked goods, the neutralization of strong leather-making acids and the removal of gypsum from processing equipment are typical of the many and diverse processes that have adopted properties of SOLVAY Ammonium Bicarbonate. These properties include the economical and complete volatilization to a nontoxic gas at low temperatures and without residue. Its solutions have lower pH and yet greater neutralizing ability than certain competitive alkalis. It also provides a dry, crystalline source of ammonia for packaged cleaning compounds.

Whether your need ranges from a material to create voids, to mild neutralization of acids, or to a dry source of ammonia for household cleaning compounds—check the properties of SOLVAY Ammonia Bicarbonate.

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ALLIED CHEMICAL & DYE CORPORATION
61 Broadway, New York 6, N. Y.

Please send me without cost:

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☐ Specific information requested in my attached letter.

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Company

Address

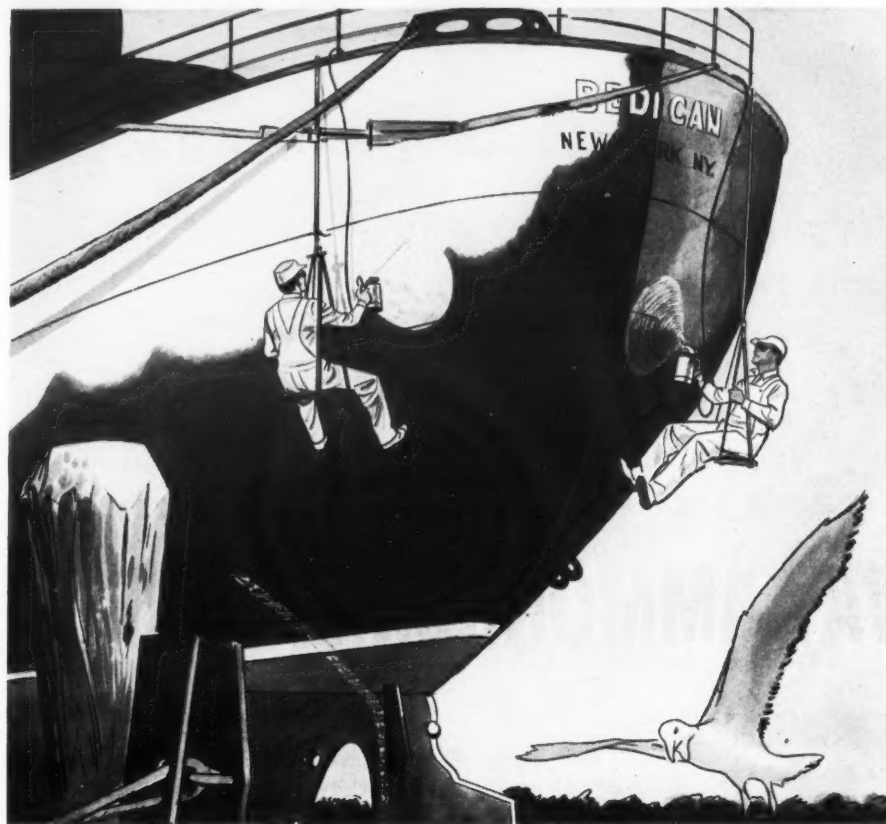
City Zone State

DS-12

Aluminum Chloride • Vinyl Chloride • Calcium Chloride
Potassium Carbonate • Sodium Nitrite • Caustic Potash
Snowflake® Crystals • Sodium Bicarbonate • Caustic Soda
Ammonium Chloride • Methylene Chloride • Methyl Chloride
Ammonium Bicarbonate • Ortho-dichlorobenzene • Chloroform
Soda Ash • Monochlorobenzene • Carbon Tetrachloride • Para-dichlorobenzene
Chlorine • Cleaning Compounds • Hydrogen Peroxide



When inquiring check 9320 opposite last page



proved corrosion resistance with wash primers

The adhesive properties of Shawinigan Resins' FORMVAR and BUTVAR are especially valuable in "wash primers." Anti-corrosion primers of this type adhere better on metal surfaces and permit better adhesion of top coat to primed surfaces. This tenacious two-way adhesion provides better protection against corrosion.

These primers or metal conditioners have other important advantages over conventional materials. They apply easier, dry faster, resist abrasion and impact, and prevent underfilm corrosion. The wash primer protective coating of only 0.3 to 0.8 mil thickness is a tough, corrosion resistant conditioner for steel, aluminum, cadmium, tin, galvanized

iron and magnesium. Formulation is easy in your regular pebble mill.

Wash primers have extended the life of metals in many applications and have opened profitable new markets for paint manufacturers. For full technical information, resin samples and suggested formulations, write Shawinigan Resins Corporation, Department 1312, Springfield 1, Massachusetts.

FORMVAR® and BUTVAR® resins by



When inquiring check 9321 opposite last page

MATERIALS

Describes more than thirty phosphorus compounds

This four-page technical bulletin describes over 30 phosphorus compounds, including elemental phosphorus. Formula, molecular weight, grade, analysis, uses, and containers are given along with the description. Phosphoric acids, tetrasodium pyrophosphate, trisodium phosphate, and a large number of phosphites, phosphonates, and phosphorothioates are covered.

"V-C Chemicals . . . their properties and uses" is issued by Chemicals Div., Virginia-Carolina Chemical Corp., Dept. CP, 401 E. Main St., Richmond 8, Va. When inquiring check 9322 on form opposite last page.

Casting and laminating with polyamide resins

Polyamide/epoxy resin products are widely-used in many different casting and laminating applications. They harden into tough, thermoset products with many attractive resultant properties. This 19-page brochure gives data and formulations.

Bul 11-E, "Versamids for Casting and Laminating", is issued by Chemical Div., General Mills, Inc., Dept. CP, Kankakee, Ill. When inquiring check 9323 on form opposite last page.



"I think a great deal of your feeling of insecurity would vanish if you didn't smoke while working with highly volatile materials . . ."

U.S.I. CHEMICAL NEWS

Nov.-Dec. ★ A Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★ 1956

Diester Lubricants Best So Far for Jet Aircraft

U.S.I. ISOSEBACIC® Acid Derivative Now Being Evaluated

A new diester formed by the reaction of U.S.I. ISOSEBACIC acid and 2-ethylhexyl alcohol is now being tested and shows promise as a lubricant for the fast moving parts of jet gas turbines. These lubricants must meet the stringent performance requirements of Military Specification MIL-L-7808 for satisfactory operation from 450°F down to -65°F — met most satisfactorily to date by diesters. The di-2-ethylhexyl ester of sebacic acid is most commonly used.

The chief advantage of the new diester is its derivation from unlimited petrochemical sources which can be counted upon to supply all needs at all times, even in emergency situations. U.S.I. ISOSEBACIC acid itself will be available in quantity when U.S.I.'s 10,000,000 lb. per year plant at Tuscola, Illinois comes onstream in mid-1957.

U.S.I. ISOSEBACIC acid is a mixture of isomers of sebacic acid in about these proportions:

| | |
|------------------------------|--------|
| 2-ethyl suberic acid..... | 72-80% |
| 2,5-diethyl adipic acid..... | 12.18% |
| sebacic acid..... | 6-10% |

In addition to the jet lubricant application, the material is being evaluated in vinyl resin plasticizers, polyurethane rubbers and foams, alkyd resins, nylon molding compounds and polyester resins. Samples can be obtained upon request.

Photographic Prints from Diaz Process Improved By Urethan Addition

The diazotype process for reproducing written and illustrative material on light-sensitive paper has been improved by incorporating carboxamides such as urethan (ethyl carbamate) into the light-sensitive diazo layer. Material can now be processed at high speed, yielding prints which are well developed, stable on storage and standing, bright in appearance and which show no tendency to curl.

Commercial diazo equipment is usually operated at or near its maximum speed of 30 feet per second in order to get the greatest throughput. At this speed, prints have in the past been frequently underdeveloped and subject to fading on storage or standing.

Now these conditions are being eliminated by incorporation of compounds such as urethan into the light-sensitive diazo layer. The preferred amount of urethan incorporated ranges from 250-350 grams per liter of diazo coating solution.

This development is but one of a growing number of applications for this versatile chemical. Urethan, first produced commercially by U.S.I., is also finding many new uses in medicine and as a starting material for chemical and pharmaceutical synthesis.

Dispersed Sodium Is Key to New Process for Rocket Fuels

Process Uses Sodium Two Ways — as Reactant and as Heat Transfer Agent

Sodium and potassium borohydrides are being produced by a new process which starts with metallic sodium dispersed in an inert liquid hydrocarbon.

Melting Points of Hafnium, Zirconium, Titanium Determined by New Technique

An improved technique for the accurate determination of melting points of metals in the temperature range 1500 to 2500°C has recently been announced which sets the value for zirconium at $1855 \pm 15^\circ\text{C}$, for titanium at $1668 \pm 10^\circ\text{C}$ and for hafnium at $2222 \pm 30^\circ\text{C}$. The improvements consist of gradient heating and refinements in cavity preparation to obtain true black-body conditions. Reproducibility of results is claimed to be $\pm 3^\circ\text{C}$.

Although M.P. values for zirconium and titanium have been obtained which are fairly constant from one investigator to another, the value for hafnium has varied widely. Temperatures of $1975 \pm 25^\circ\text{C}$, 2430°C and $2230 \pm 50^\circ\text{C}$ have been reported. This new method was developed primarily to fix an accurate melting point value for hafnium, and has been applied to zirconium and titanium as a matter of interest.

The technique is a modification of the general tungsten suspension method, whereby a small specimen is suspended by a fine tungsten wire in a slender, induction-heated tungsten or tantalum cylinder, under vacuum. U.S.I. has special interest in this refinement since it is constructing two new plants to produce titanium and zirconium as well as a hafnium oxide by-product. The sodium reduction process used for these metals is also capable of producing hafnium.

Polyethylene Drums Okayed by ICC for Certain Shipments

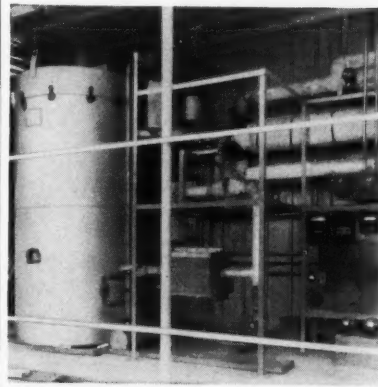
Molded polyethylene drums have recently been approved by the Interstate Commerce Commission for commercial shipment of these regulated products: alcohols, acids or other corrosive liquids not specifically provided for, hydrochloric acid, hydrochloric acid mixtures, hydrochloric acid solutions, sodium chlorite solutions, hydrofluorosilicic acid, hydrofluoric acid, sulfuric acid, hypochlorite solutions, formic acid, formic acid solutions.

Those who wish to use polyethylene drums for the shipment of regulated products not listed above should apply to the Bureau of Explosives, 30 Vesey Street, New York, N. Y. for temporary permits. Nonregulated product shipments by road and rail were approved by the ICC early in 1955.

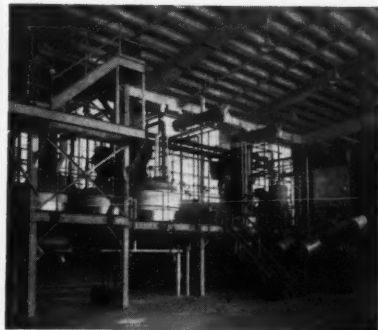
A semi-commercial plant now in operation is getting yields of about 95% on sodium borohydride (based on methyl borate), and up to about 90% on the potassium compound (based on contained KBH_4).

Borohydrides have been in the news lately as intermediates in the preparation of diborane, precursor of pentaborane rocket fuel. They are also achieving recognition among drug and fine chemical manufacturers as selective reducing agents for certain organic compounds, where undesirable side reac-

MORE



Heat supply system for sodium borohydride plant using the sodium-potassium alloy NaK as heat transfer fluid. Furnace, electromagnetic pump and heat exchangers are shown. Photo courtesy of the Callery Chemical Company.



Reactors (left) and condensers (right) for sodium hydride preparation. Photo courtesy of Metal Hydrides Incorporated.

Nov.-Dec. ★

U.S.I. CHEMICAL NEWS

★ 1956

CONTINUED Sodium

tions must be avoided. A recent article also indicates possible use for sodium borohydride as a pulping agent in the paper industry.

Sodium Hydride Formed First

In the new process, molten sodium and a refined, high-boiling mineral oil are agitated with high shear and heated in a hydrogen atmosphere. This breaks the metal into tiny particles which react with the hydrogen gas to yield finely dispersed sodium hydride coated with oil. Methyl borate is then added to produce a mixture of sodium borohydride and sodium methoxide. The sodium borohydride is then solvent extracted and dried.

Where the potassium compound is desired, an aqueous potassium hydroxide solution is added to the mixture of sodium derivatives to precipitate potassium borohydride.

A circulating sodium-potassium (NaK) alloy system is used to heat the reaction mass. The liquid metal is heated in a furnace, dissipates its heat in a heat exchanger, and is circulated back through the furnace. Circulation is provided by an electromagnetic pump which has no stuffing boxes and is therefore not subject to the usual leakage and maintenance problems of ordinary pumps.

Dispersions Have Advantages

The sodium dispersion technique, originally developed to commercial feasibility by U.S.I., contributes several very important advantages in the new process:

- Rate of hydride formation is faster.
- The oil coating makes the hydride easier to handle.
- Reaction of the hydride with methyl borate is 10 times faster, proceeds efficiently, doesn't require excess hydride.
- Oil absorbs heats of solution and reaction, prevents decomposition which might result from overheating.

U.S.I. Technical Service Engineers, with experience gained in the company's sodium production facilities, have worked with two new borohydride producers in developing their plant and process designs.

Flexographic Printing Gets New "Voice"

Alcohol Use in Inks Reviewed

This September the first trade magazine devoted exclusively to flexographic printing made its debut. Called "Flexography", the magazine was created to meet the demands of this fast-growing industry for information on materials, techniques and equipment.

Flexography, a form of letterpress printing, uses rubber plates instead of metal and fluid inks which dry by solvent evaporation. An article on these inks and their formulation appears in the first issue of the new publication and should be of interest to all printing ink manufacturers.

U.S.I. Filmex® Used in Flexographic Printing

Proprietary ethyl alcohol, according to the article, is the most versatile and commonly used solvent for the colorants and vehicles which go into flexographic inks. U.S.I. makes an alcohol formulation known as FILMEX® which was specifically designed for this application. It is carefully formulated to eliminate all trace of hydrocarbons which might soften or otherwise deteriorate rubber plates and rolls. FILMEX® is one of the most reliable solvents on the market for the purpose.



ZIRCONIUM, TITANIUM WILL BE MADE HERE
To house U.S.I.'s new 10 million pound-per-year titanium sponge plant as well as its 1.5 million pound-per-year zirconium sponge plant, the company has recently purchased this 175,000 square foot building at Ashabula, O., near the existing U.S.I. sodium-chlorine plant. Acquisition of the giant building is expected to cut six months to a year from U.S.I.'s construction time table.

TECHNICAL DEVELOPMENTS

Information about manufacturers of these items may be obtained by writing the Editor, U.S.I. Chemical News.

Basic formulations for a new type aerosol skin bandage are now being offered to aerosol marketers and contract fillers in the drug field. After spraying on, the dry films reportedly adhere well, are transparent and tough. **No. 1180**

"What's Available on Microprint Cards", a free 8-page booklet, can now be obtained which lists the technical literature which has been put out in this form. This bibliography is divided by subject, includes works on chemistry, mathematics and physics among others. **No. 1181**

A 125-page report on zirconium can be purchased which covers its chemistry, properties, production and fabrication—from both the economic and technological standpoints. **No. 1182**

New synthetic resin in 2 types—anionic and cationic—are offered as permaselective ion exchange membranes. Other possible uses are suggested by film properties of strength, toughness, flexibility and freedom from static. **No. 1183**

A summary on amino acid research can now be purchased which covers: the effects of DL-methionine supplements on animals; the effects of amino acid imbalance on maintenance and growth; and the amino acid needs of children. **No. 1184**

Acrylic thickener recently developed is shipped as high-solids, low viscosity acidic emulsion, is diluted and neutralized to clear, viscous, low-solids solution at point of use. Said to have long-term stability. **No. 1185**

Radioactive phenol—C¹⁴ (uniformly labelled) is now being offered as a tracer or synthetic intermediate in studying plant and animal chemistry, and as an aid in analyzing products such as insecticides, medicinals, plastics. **No. 1186**

Polyethylene-based ointments containing antibiotics and other pharmaceuticals are now available. Polyethylene replaces petroleum in part in these preparations, and is said to release more medicine at a slower rate. **No. 1187**

The dipotassium salt of (ethylenedinitrilo) tetracetic acid is now offered as a chelating agent. Has better solubility in alcohol than the sodium salt. Material is a white solid, soluble in water. **No. 1188**

A new gun for extruding caulking compounds has been devised in which air pressure forces the compound out of a disposable polyethylene cartridge through a polyethylene nozzle screwed to it. Smooth, automatic operation is claimed. **No. 1189**

PRODUCTS OF U.S.I.

INORGANIC CHEMICALS:

Sodium, Metallic: cast solid in tank cars, steel drums, pails; bricks in barrels, pails.

Chlorine: liquid, in tank cars.

Caustic Soda: 50% liquid, in tank cars.

Sodium Peroxide: dust-free granules, in drums.

Sulfuric Acid: all strengths, 60° Baumé to 40% Oleum. Also Electrolytic grade to Federal specifications. Tank cars or tank wagons.

Ammonia: Anhydrous, commercial and refrigeration. Tank cars or tank wagons.

Also Nitrogen Fertilizer Solutions.

OTHER PRODUCTS:

Alcohols: Ethyl (pure and all denatured formulas), Normal Butyl, Amyl, Fusel Oil; Proprietary Denatured Alcohol Solvents SOLOX®, FILMEX®, ANSOL® M, ANSOL® PR.

PETROTHENE® Polyethylene Resins.

Esters, Ethers and Ketones: Normal Butyl Acetate, Dibutyl Phthalate, Diethyl Carbonate, Diethyl Oxalate, Ethyl Acetate, Ethyl Ether, Acetone.

Intermediates and Fine Chemicals: Acetoacetylides, Ethyl Acetoacetate, Ethyl Benzoylacetate, Ethyl Chloroformate, Ethylene, Ethyl Sodium Oxalacetate, Sodium Ethylate solution, Urethan USP (Ethyl Carbamate).

Animal Feed Products: Calcium Pantothenate, Choline Chloride Products, Curbay B-C® 80, Special Liquid Curbay®, DL-Methionine, Niacin USP, Riboflavin Concentrates, Vitamin B₁₂ and Antibiotic Feed Supplements, Vacatone® 40, Vitamin A, D₂ and K₃ products.

Pharmaceutical Products: DL-Methionine, N-Acetyl-DL-Methionine, Riboflavin USP, Urethan USP, Intermediates.

U.S.I. SALES OFFICES

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INDUSTRIAL CHEMICALS CO.

Division of National Distillers Products Corporation

99 Park Avenue, New York 16, N. Y.

**All-purpose silicone rubber
that's easy to process
meets major specs . . .**

appliance and aeronautical application seen

Uses: For silicone products used in home appliances and in aeronautical applications.

Features: One compound meets aeronautical material specifications, joint military rubber specs (MIL-R), and ASTM specs in the appropriate hardness. Rubbers are very easy for the fabricator to process, as they are pre-conditioned before shipping. Rubbers also have controlled reactivity which makes possible low compression-set without use of toxic additives and permits employment of catalyst systems which eliminate step-wise post-cures for thick sections.

Rubbers have high tear, high elongation, tensile strength of over 800 psi, low compression set, good oil resistance, low moisture absorption, good dry and wet dielectric properties.

Description: Vinyl silicone rubber compounds come in 40, 50, 60, 70, and 80 Duro hardnesses. They are red in color. Rubbers can be returned to a freshened state, ready for fabricating, with just a few turns of the mill. This sometimes takes less than one minute. Product may be purchased uncatalyzed or with a catalyst specified by the fabricator.

(K-1040R series silicone rubbers are products of Silicones Div., Union Carbide and Carbon Corp., Dept. CP, 30 East 42nd Street, New York 17, N.Y. . . . or for more information reader may simply check 9324 on the Reader Service slip which is located opposite last page.)

**Methods of mixing and using
flexible-mold compound**

Applications, physical properties, and methods of mixing and using cold-setting compound for making flexible rubber molds, are explained in two-page technical bulletin. Instructions tell how to prepare models of different materials with varying surface coatings, how to remove the model, and how to cast into the resultant mold with plaster or epoxy resins. Preparation of large molds is also covered.

Tech Bul 12 is issued by Smooth-On Manufacturing Co., Dept. CP, 572 Communipaw Ave., Jersey City 4, N.J. When inquiring specify 9325 on form opposite last page.

For more information on products at left, specify 9326 . . . see information request blank opposite last page.

We fit our production to YOUR needs



Our specialty is making white oils, petrolatums and petroleum sulfonates to fit specific needs. Since we've been doing this for more than half a century, we know how to make these products exactly the way our customers want them.

Chances are, there's a white oil, a petrolatum or a petroleum sulfonate among the many types and grades in our regular line that will be just right for your purpose. But if there isn't, we'll tailor-make one for you.

No matter what your problem may be, you may be sure we shall fit our production to your needs!

L. SONNEBORN SONS, INC.
New York 10, N. Y.



White Oil, Petrolatum & Sulfonate Div.
L. SONNEBORN SONS, INC., Dept. CP12
300 Fourth Avenue, New York 10, N. Y.

Gentlemen:

Will you please send me Technical Data on the following:

☐ White Mineral Oils ☐ Petrolatums ☐ Petroleum Sulfonates

What can you do to help me solve this problem?

Name.....

Company.....

Address.....

City.....Zone.....State.....

When inquiring check 9327 opposite last page

MATERIALS

Economical and practical sulfonations seen with trimethylamine-SO₂...

should be especially considered in sulfonation of natural products

Uses: Compound may be employed in preparation of sulfamic acids and esters of sulfuric acids under relatively mild conditions.

Features: The use of water as reaction medium makes sulfonations both economical and practical. Although trimethylamine sulfur trioxide (TMAST) hydrolyzes slowly in water, the use of water as a solvent for reaction with alcohols or amines is successful because of the faster reaction with the latter compounds.

TMAST can be employed to separate isomeric compounds containing amino or hydroxy groups by virtue of differing reaction rates with the isomers. This compound has been used in the preparation of sulfuric ester salts of leuco quinones, especially leuco vat dyestuff, in aqueous alkaline media. The ease with which TMAST reacts with alcohols and amines suggests its consideration in the sulfonating of natural products.

Description: TMAST is available in research quantities. Supplied as shiny colorless plates, the compound melts at 91.5°C. The product is soluble in ethanol, acetone, and ethylenedichloride. In water, 6.4% hydrolysis occurs after 24 hours at 50°C. It is soluble in water to a degree of 5.8 gm/100 ml at 45°C.

(Trimethylamine sulfur trioxide is offered by Intermediates Dept., American Cyanamid Co., Dept. CP, Bound Brook, N.J. . . . or for more information check 9328 on form which is located opposite last page.)

Know-how of corrosion-resistant wash primers expostulated

Formvar and Butvar resins (polyvinyl butyral and polyvinyl formal resins, respectively) give highly corrosion-resistant wash primers for metal when formulated correctly. Primers have tenacious adhesion, flexibility, abrasion resistance, toughness, and resistance to chemicals and temperature extremes. Their protective action on all types of metal surfaces is described in this 16-page booklet. In addition to giving properties of the resins, preparation of the primers and suggested formulations and applications of the primer are detailed.

"Butvar, Formvar for Corrosion-resistant Wash Primers" is issued by Dept. EF, Shawinigan Resins Corp., Dept. CP, Springfield 1, Mass. When inquiring check 9329 on form opposite last page.

A
QUAKER OATS
CHEMICAL
USE
REPORT



**TETRAHYDROFURFURYL
ALCOHOL**



important in:

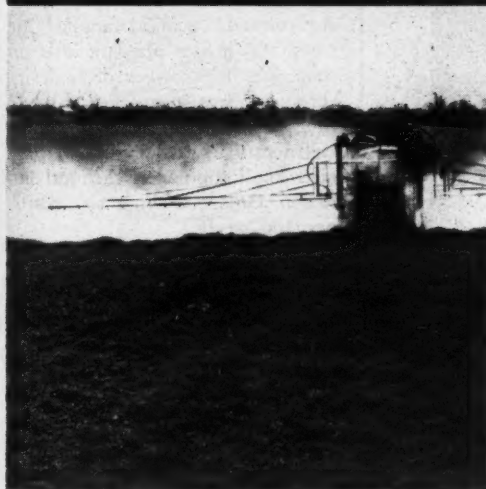
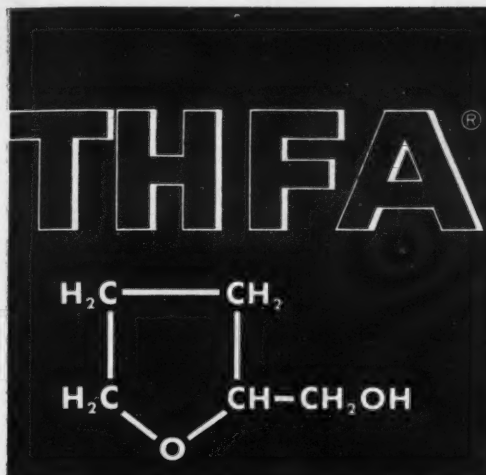


Photo: Courtesy of California Spray-Chemical Corp.

IMPORTANT NOTICE: Investigate new low price of THFA made possible by new process.



336M The Merchandise Mart,
Chicago 54, Illinois

ROOM 536M, 120 Wall St.,
New York 5, N. Y.

Room 436M, Main P. O. Box 4376,
Portland 8, Oregon

In Europe:
Quaker Oats-Graanproducten N. V., Rotterdam, The Netherlands;
Quaker Oats (France) S. A., 3, Rue Pillet-Will, Paris IX, France;
A/S "Ota", Copenhagen, S. Denmark

In Australia:
Swift & Company, Pty., Ltd., Sydney

In Japan:
F. Kanematsu & Company, Ltd., Tokyo

1. Leather Finishing

QO Tetrahydrofurfuryl alcohol is becoming increasingly important in the finishing of leather. THFA dissolves many difficultly soluble dyes and keeps them dispersed even when dye solutions cool. Its action as a highly efficient "driver" produces deep penetration and aids in leveling spray and flame coats. THFA is unusual in its ability to penetrate through the grain of leather without disturbing the fat liquor balance so necessary for flexibility and proper feel of leather. Not to be overlooked is the use of THFA as a resin solvent which aids resin penetration and adhesion to leather surfaces.

2. Organic Synthesis:

Tetrahydrofurfuryl alcohol acts like both an alcohol and an ether. The hydroxyl can be replaced by other functional groups, and the ring can be cleaved to a variety of open chain compounds which may be recycled to 5- or 6-membered heterocyclic types.

THFA is used for the preparation of high boiling esters. Tetrahydrofurfuryl oleate is an example; it has found considerable use as a plasticizer.

Dihydropyran, derived from THFA, is a source of a variety of compounds including piperidine, glutaric acid and 1,5- difunctional open chain types.

3. Esters of THFA Yield a Nonvolatile Herbicide

Tetrahydrofurfuryl alcohol esters of 2,4-dichlorophenoxyacetic acid (2,4-D) and 2,4,5-trichlorophenoxyacetic acid (2,4,5-T) are brush and weed killers. They have low volatility, are readily soluble in organic compounds, and contain maximum percentages of 2,4-D and 2,4,5-T components for effective herbicidal activity. These herbicides cling to brush and weeds until they're killed and control possible vapor injury to adjacent sensitive crops. They are commercially available in packaged formulations.

Write for our new Bulletin 206 on QO Tetrahydrofurfuryl Alcohol; it presents chemistry, physical properties and uses of THFA.

MATERIALS

Higher pigment-bonding strength, adhesion given to copolymer of styrene-butadiene . . .

paints made from this latex have excellent freeze-thaw and storage stabilities

Uses: In the manufacture of latex paint.

Features: This latex possesses increased pigment bonding strength and improved adhesion to a variety of surfaces. It has been subjected to over 40 freeze-thaw cycles with no apparent change in viscosity and also has excellent storage stability. Its chemical and mechanical stability permits paint manufacture to be simplified and permits use of conventional equipment. Latex has fine particle size in comparison with other high-styrene types of latices.

Paints formulated with this latex are characterized by ease of application and clean-up and have a high level of scrubability. Because of pigment-bonding strength of latex, paints have efficient leveling and covering properties, uniformity of sheen, and good enamel holdout. Stains may also be removed easily.

Description: Latex is a styrene-butadiene copolymer fortified during polymerization with an additional ingredient to enhance the properties. Paints made with it can be formulated with typical water-dispersible pigments and low-cost extenders. Pigment-bonding strengths are maintained even with high pigment volume concentrations, durable films being achieved in paints having a pvc as high as 43%. Paints made with this latex have undergone numerous freeze-thaw cycles at -5°F with only minor changes in viscosity.

("Dylex Latex K-34 is a product of Koppers Co., Inc., Dept. CP, Koppers Bldg., Pittsburgh 19, Pa. Check 9331 on form opposite last page.)

Activated charcoal and equipment

The title of this brochure suggests that there is some "voodoo" connected with the versatile accomplishments of activated charcoal, but after perusing the more than 50 pages, one finds that it's manufacturing and engineering know-how that makes it that way. Divided into three sections, the catalog covers equipment, where and how to use it, and theory. The manufacturer says that if this last section is memorized, it will make the reader a "super expert on the subject so that he can argue with other experts."

"Black Magic of Activated Charcoal" is issued on direct communication to Pur Air Division, Barnebey-Cheney Co., Dept. CP, Columbus 8, Ohio.

When inquiring check 9330 opposite last page



Genie in the Bottle...POLYURETHANE FOAMS

Celanese serves this fast growing industry with basic chemicals and plasticizers

What is your wish . . . acoustical insulation, clothing interliners or aircraft seat cushions? These and many more are sound applications for the new polyurethane foams. Starting as liquids, these chemical compounds expand up to 20 times their volume, and cure in minutes into rigid or resilient forms as required.

A hundred-and-one industries already are prime markets for the producers of polyurethane foams. And the number is growing daily as manufacturers discover their many advantages—particularly the advantage of flame resistance

which is imparted to the foams by the addition of a plasticizer such as Celanese Celluflex CEF.

In continuous commercial volume Celanese also produces trimethylolpropane . . . a high purity polyol with proven cross-linking properties . . . as well as propylene glycol and 1,3 butylene glycol. These results of applied research are solving many problems in making the new polyurethane materials ever more useful and economical. Celanese Corporation of America, Chemical Division, Dept. 591-L, 180 Madison Avenue, New York 16, N. Y.

Celanese® Celluflex®

Basic reasons

| | | |
|------------|--------------------|----------------|
| Acids | Functional Fluids | Polyols |
| Alcohols | Gasoline Additives | Plasticizers |
| Aldehydes | Glycols | Salts |
| Anhydrides | Ketones | Solvents |
| Esters | Oxides | Vinyl Monomers |



.....for improved products

Agricultural, automotive, aviation, building, electrical, paper, pharmaceutical, plastics, surface coatings, textile.

MATERIALS

Organic Intermediate: acetoacetic ester

used to make drugs, dyes, perfumes

Uses: Used in synthesis of drugs, dyes, and perfumes.

Features: Ester content is 98-99%.

Description: Acetoacetic ester is a water-white liquid. It is shipped in light weight aluminum drums.

(Acetoacetic ester is distributed by Aceto Chemical Co., Inc., Dept CP, 40-40 Lawrence St., Flushing 54, N.Y. . . . or for more information check 9332 on form opposite last page.)

Applied to moist soil before planting crop, kills bugs, weeds

Agricultural chemical applied to moist soil before planting kills or suppresses many types of undesirable organisms such as weed seedlings, certain soil insects, fungi, and nematodes. Additional wetting after application seals chemical into soil. Dosage is about 1½ quarts per 100 sq ft.

(Vapam Soil Fumigant is a product of E. I. du Pont de Nemours & Co. (Inc.), Dept. CP, Wilmington 98, Del. . . . or for more information check 9333 opp. last page.)

ASTM test significance— petroleum products

An outline of the significance of various ASTM test methods related to petroleum products is covered in 134-page paperback book, costing \$6.75, from the American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa.

For more information on product at left, specify 9334 . . . see information request blank opposite last page.

Cold water-soluble cellulose derivative makes good adhesive, binder . . .

fibers of microscopic size have been retained during manufacture

Uses: As an adhesive and binder and as a thickener, emulsifier, in the pharmaceutical, cosmetic, book, paper, textile, paint and detergent industries.

Features: Compound is readily soluble in water of any temperature. Adhesive and binding properties are superior because microscopic fibers are retained during the manufacturing process.

Description: Ethyl-hydroxyethyl cellulose is derived from alpha wood pulp. It is supplied as white, compact, neutral, free-flowing granules. Available in three viscosities (20, 100, and 600 cps), solution keeps indefinitely and does not mold.

(Ethulose is a product of Gaston Johnston Corp., Dept. CP, 24-64 45th Street, Long Island City 3, N.Y. Check 9335 opposite last page.)



**WANTED:
BUDDING
CARTOONISTS!**

CHEMICAL PROCESSING is in the market for cartoons (and cartoon ideas). They should touch on some aspect of chemical plant or lab work.

Worth \$10—Cartoons in black ink on 8 1/2 x 11" sheets—ready to reproduce—will be bought for \$10, paid on acceptance.

Worth \$5—Cartoon ideas . . . a written description or rough sketch of scene, and a caption . . . worth \$5, on acceptance.

Send your gag material to:

Cartoon Editor, CHEMICAL PROCESSING
111 East Delaware Place
Chicago 11, Illinois

Be sure to include your name, position, company, and address.

OH F

There's a completely
new answer in filtrations
involving caustics or
fluorides...

GLC Nerofil®

The new processed carbon-based filteraid

NEROFIL was developed primarily for filtrations involving strongly alkaline solutions where diatomite is at a disadvantage, due to silica solubility, and where no other filteraids have proved entirely satisfactory.

NEROFIL is processed from selected carbonaceous materials. Due to low cake density and high cake porosity, it is a highly effective filteraid, with flowrates comparable to many grades of diatomite and excellent filtrate clarity. Since the filter cake is combustible, disposal presents no problem. Metals values recovery is thus made easy in the filtration of metallurgical solutions.

NEROFIL is both physically and chemically stable. Boiling 50% caustic has negligible effect on NEROFIL . . . tests show no silica solubility in 50% sodium hydroxide at 125°F. in a 30-minute period.

This new filteraid is proving highly successful in caustic and sulfur production, in textile mercerizing, processing involving ligno-sulfonates, and in filtering plating solutions. For more information, send in the coupon, at right, today!

GREAT LAKES CARBON CORPORATION
NEROFIL DEPT. — 612 So. Flower St., Los Angeles 17, Calif.
Dept. LTK—333 No. Michigan Ave., Chicago 1, Ill.



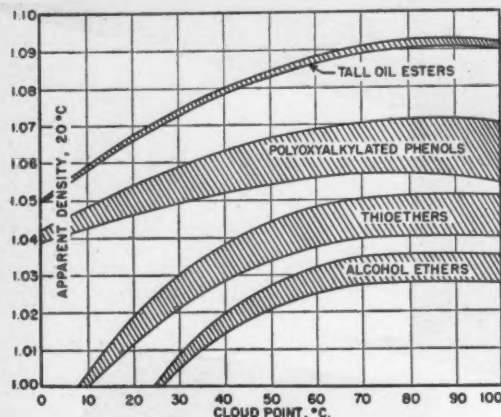
NEROFIL DEPARTMENT,
GREAT LAKES CARBON CORPORATION
612 So. Flower St., Los Angeles 17, Calif.

Name _____
Position _____
Company _____
City _____ Zone _____
State _____

When inquiring check 9336 opposite last page

Nonionic surface-active agents found by density-cloud point

Here's a chart that permits ready identification of nonionic surface-active agents in unformulated concentrates, commercial products, and in wash baths.



This is how to use it.

- 1 — Find apparent density of anh. material
- 2 — Find cloud point of 0.5% aq solution
- 3 — Plot both points on the chart

(Information courtesy of Chemical Specialties Manufacturers Association, 50 E. 42nd St., New York 17, N. Y.)

Detailed catalog of resins, organics, and solvents

Manufacturer's full line of resins, solvents, anti-skinning agents, oils are detailed in this 8-page catalog. Specifications, solubilities, and compatibilities of the resins, and application suggestions are given.

"Neville Products to Make Your Products Better" is issued by Neville Chemical Co., Dept. CP, Pittsburgh 25, Pa. When inquiring specify 9337 on form opposite last page.

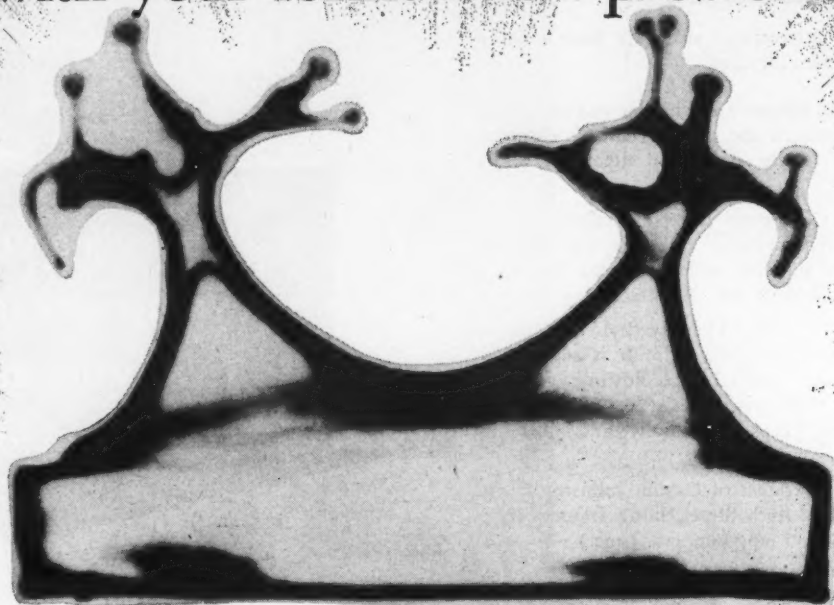
Low-cost plasticizer for vinyl products . . .

phthalate ester has host of good characteristics

Uses: As a plasticizer in vinyl formulations (such as vinyl flooring, welting, garden hose) and other extruded vinyls where color is only a minor factor. It is also good for coated fabrics, slush and dip moldings, and wire and cable covering.

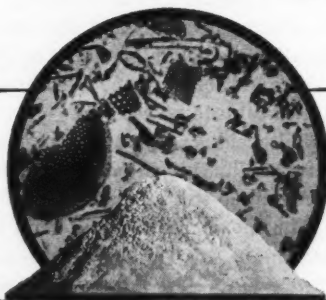
Features: Plasticizer has dry feel, superior

What's this ⁶⁶CROWN⁹⁹ got to do with your formulation problems?



This is a particle of Celite diatomaceous earth. The genus is *Dicladia*, species is *Capreolus*. Loosely translated it means "two-sided branch." This particle is just one of hundreds of different intricate particles that together make Celite such an efficient mineral filler. When placed under a microscope *Dicladia Capreolus* becomes a rustic "crown."

It's a particle of CELITE with a cubic foot



The secret of diatomite's remarkable properties—The infinite variety of particle shapes and sizes gives Celite diatomite its exceptional performance characteristics in a wide range of process applications. Irregular shapes like the "crown" prevent packing down for high bulking action.

Johns-Manville CELITE

solvation, a much improved extrusion rate, and easy processing at high durometer hardness. Plasticizer has excellent toleration of relatively high amounts of low-cost extenders, and offers superior toleration of high filler loads for a given degree of hardness. UV stability is excellent with no spewing and no color changes.

Description: Phthalate ester is low in cost. It provides high initial viscosity, fast gel rate, and fast cure for special plastisols. Standard wire test shows 30% greater elongation retention than formulation containing DOP, over a period of 7 days at 100°C.

(Polycon #40 is a product of Brown-Allen Chemicals, Inc., Dept. CP, PO Box 1, Staten Island 2, N.Y. Check 9339 opposite last page.)

Proper use of hydrocarbon resins improves rubber characteristics

By proper choice and concentration of Velsicol hydrocarbon resins, calendering, processing and tubing characteristics of rubber base stock may be improved. Toughness, hardness, and tear resistance can be imparted as well as high tensile strengths, and excellent resistance to abrasion and aging. This 20-page bulletin gives many recipes and physicals for various stocks.

Tech bul 218 (revised) is issued by Velsicol Chemical Corp., Dept. CP, 330 E. Grand Ave., Chicago 11, Ill. Specify 9340 opp. last page.

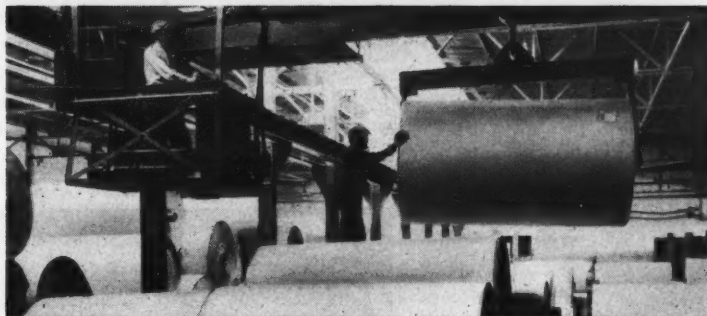


Thanks to Tom De Fail, Westinghouse Atomic Power Division, Bettis Plant, Pittsburgh, Pa.

Cuts cost of formulating insecticide dusts—Celite's extraordinary bulking action allows insecticide formulators to extend poisons for greater coverage from a given weight. Celite also serves as an anticaking agent for this industry.



Controls package loss in cleansers—Cleansers and other powder products remain "fluffed up" after packaging when formulated with Celite. Celite also serves as an absorbent for detergents, wetting agents and odorants.



Adds needed bulk to paper—Because of its exceptionally low apparent density, Celite increases bulk in paper as much as 10% with a corresponding increase in machine speed. Celite is also used in paper mills to control pitch and improve brightness, opacity and ink receptivity.

—the inert mineral filler of bulk in every ten pounds

AS MUCH AS 10 TIMES greater bulking action than any other mineral filler. That's what you get when you formulate with Celite*. Composed of microscopic irregularly shaped particles of diatomite that won't pack down, Celite contains as much as 93% air space or voids in a given volume. And with its low cost per unit volume, Celite gives you far more bulk per dollar than other mineral fillers.

Many important filler applications are derived from Celite's unique prop-

erties. Its light porous mass provides great absorptive capacity, permitting preparation of high concentrate insecticides and other liquids in a dry, free-flowing powder form. The vari-shaped microscopic particles have large surface areas which serve to extend pigments in paint and paper-making. Other important uses include molded plastics, matches, concrete, acetylene tank fillers and adhesives.

Produced from the world's purest commercially available diatomite de-

posit, Celite comes in a wide range of grades. Each grade is carefully controlled for complete uniformity.

Ask your local J-M Celite engineer to tell you how Celite can help solve your formulation problems. He's backed by Johns-Manville's extensive research facilities and years of practical diatomite experience. Call him today or write Johns-Manville, Box 14, New York 16, N. Y. In Canada, write Port Credit, Ontario.

*Celite is Johns-Manville's registered trade mark for its diatomaceous silica products.



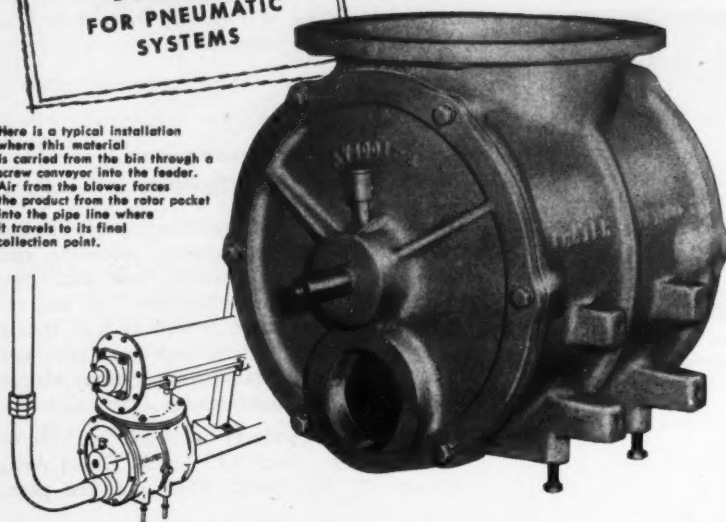
Industry's most versatile MINERAL FILLERS

When inquiring check 9338 opposite last page

NEW! FOR HANDLING FREE-FLOWING PRODUCTS

PRATER BLOW-THRU FEEDER FOR PNEUMATIC SYSTEMS

Here is a typical installation where this material is carried from the bin through a screw conveyor into the feeder. Air from the blower forces the product from the rotor pocket into the pipe line where it travels to its final collection point.

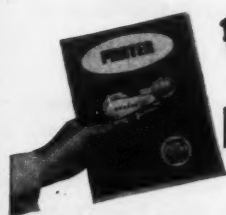


No matter how attritionized the product, this new Prater Blow-Thru Feeder will feed it efficiently and quickly into any pneumatic system. And this new design becomes an integrated part of the pipe line and will feed against pressures as high as 10 PSIG... either positive or negative!

One of the efficient design features of this unit is that on the horizontal center line of the body casing is a pressure neutralizing port to bring the rotor pockets to atmospheric pressure before filling.

There are many other interesting and high quality production features. Power requirements vary according to the fineness and abrasiveness of the product... flour, salt, carbon or any other material.

Available in cast iron and bronze... write today. Ask for our new airlock catalog, the most comprehensive in the industry!



FREE!

PRATER PULVERIZER COMPANY

1517 S. 55th Court
Cicero, Illinois

When inquiring check 9341 opposite last page

material handling

Powered loading facilities at Shell Chemical's Pittsburg, California, plant have eliminated downtime to the point where...

SHIPPING CAPACITY

Problem: During the past few years the demand for faster and more direct delivery by transport truck to fertilizer consumers necessitated a reappraisal of the shipping facilities at Shell Chemical Corporation's Pittsburg, California plant. The original facilities were substantially designed for rail car loading and with increases in production capacity plus the

growing demand for truck deliveries it was determined that in order to maintain an efficient material handling operation costly moving of existing bag filling machinery might be required.

Previous handling method has these drawbacks when applied to trucks: Considerable downtime was required to assemble a sectionalized gravity conveyor



This view from above shows the individual segments of the conveying mechanism. Each roller is grooved to fit the endless coil conveyor belts. This truck loading unit at Shell extends a full 40 feet

ITY

INCREASES 50%

system from point of discharge, to carry the bags out onto the front of the flat bed trucks used for the purpose — a matter of 35' across the truck bed itself. Then, as loading progressed, the crew had to stop periodically and remove sections of the portable conveyor system.

To fit into the existing floor plan, the loading system also had to be "double-ended" — that is, deliver out of both sides of the packhouse to stacking point in boxcars or trucks.

Solution: After investigation of a number of systems, a flexible, self-powered and reversible conveyor procedure was found to satisfy all requirements. In January, 1956, a 40' conveyor of this type was installed, moving the bags on a series of powered, grooved rollers connected with endless coil spring belts. Each conveyor section is 15 inches long, and pivoted, so that the entire conveyor can "turn corners" into the end of boxcars, snake around posts, and deliver the goods at any desired spot. Vertical hinges accommodate difference between truck bed and dock heights. Elevating discharge headstands keep delivery point above height of stack to eliminate bag lifting.

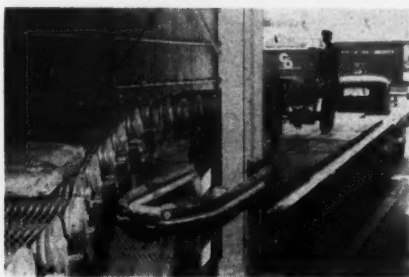
One man can move the entire 40' conveyor merely by pushing forward-reverse buttons located at either end, and guiding it into the desired position.

Results: Down time in the bag loading operation has been cut so drastically that shipping capacity has been increased slightly over 50%. Flow of bags from the packer is now almost continuous since all changes in the position of the loader — forward, backward; left or right; up or down—are made without stopping the flow of bags.

The loader is stored under the packer conveyor so that no additional floor space was required for installation. In addition, the new system fits into a general plan for automation of the fertilizer bagging operation, so that new components can be added to the entire



As trailer is loaded, conveyor is retracted in seconds by pushing button under table



One man can snake the powered, self retracting conveyor wherever needed for loading



A second power-curve conveyor at the Shell Pittsburgh plant is used for various plant loading jobs, as boxcar loading, shown here

operation, without the conveyor system's having to be ripped out and replaced.

(Power loading conveyor was manufactured by Power Curve Company, Dept. CP, 2185 South Jason St., Denver 23, Colo. Check 9342 opposite last page.)

TOTE SYSTEM*



first...

- To bring you a new, more efficient method of bulk materials handling
- In number of installations
- In sanitation
- In flexibility
- In compactness
- In savings
- To offer the CONTAINER CAR which simply and cheaply solves bulk delivery problems of off-rail users

Want to know how Tote System fits your picture? Write for illustrated literature, or ask for a survey by Tote engineers. No obligation.

TOTE SYSTEM, INC.

*Tote and Tote System Reg. U.S. Pat. Off.

680 So. 7th, Beatrice, Nebraska

When inquiring check 9343 opposite last page

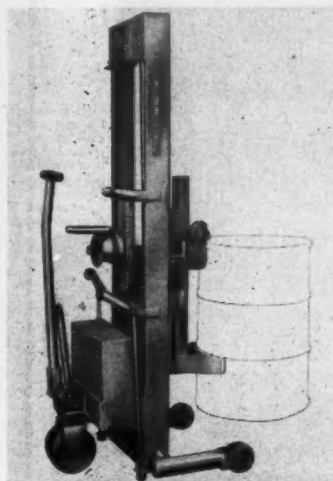
MATERIAL HANDLING

Lifts, carries steel, fiber drums, open or closed . . .

unit handles any drum regardless of diameter or height

Uses: Stacker handles and double-tiers fiber or steel drums of any size or height.

Features: Jaws of lifting mechanism automatically engage drum when attachment is pushed against



Semi-counterbalanced stacker does not straddle drum to be picked up

drum and raised slightly. To release drum, operator lowers it to resting surface and continues to lower slightly.

Description: Stacker has capacity of 550 lb, lifting height of 38" to the underside of standard 55 gallon drum. Overall height is 76", width is 28".

Jaws of lift mechanism operate on standard steel, removable lid, fiber and light gage disposable drums, either open or closed. Unit has 8" diameter front wheels with truck steer and 5" diameter rear wheels.

The stacker is semi-counterbalanced so that it does not straddle drum to be picked up . . . it can take drum from between two adjacent ones without touching either.

(Drum Stacker is product of Lewis-Shepard, Dept. CP, Watertown, Mass. Check 9344 opp. last page.)



More Productive . . .



All kinds of processing and manufacturing plants are reporting exceptional satisfaction with the performance of the new-model HA "PAYLOADER" tractor-shovels. With their larger 18 cu. ft. buckets, they not only handle more tonnage of bulk materials than earlier models, but are way ahead of other front-end loaders in design and productivity — can deliver more tons per hour than heavier machines with larger engines.

Exclusive one-lever control handles tip-back, lift, dump and lowering of the bucket, simplifying and speeding operating cycles. The 40 degree tip-back of the bucket at ground level gets and holds big loads close and low without spilling. Hydraulic load-shock-absorber smooths the ride and permits higher travel speeds.

Fast, efficient and low-cost boxcar loading and unloading

Pick-up
aisles,

Special
and "

Grea
HA,
on ei
floor

T
3
w
y
f
li
1
L
fa



MATERIAL HANDLING

Gives specifications of platform truck

Setting forth specifications and drawings of platform truck, four-page bulletin in three colors is punched for notebook filing. Truck described has load capacity of 4000 lb and is operator-led.

Bul No. 1003-W is issued by Automatic Transportation Company, Division of Yale & Towne Mfg. Co., Dept. CP, 149 W. 87th St., Chicago 20, Ill. When inquiring specify 9345 opposite last page.

Shows deep trough conveyor idlers

Four-page, three-color bulletin describes manufacturer's line of deep trough belt conveyor idlers. Units illustrated are especially designed for handling light-weight bulk materials.

Bulletin No. NT42-A is issued by Barber-Greene Company, Dept. CP, 400 N. Highland Ave., Aurora, Illinois. When inquiring specify 9346 on form opposite last page.

Features automatic scale for bagging

Design, operation, and key features of automatic bagging scale are given in two-page two-color bulletin. Scale described will automatically weigh, proportion, blend, and bag three dry mix ingredients.

Bulletin No. 6041 is issued by Richardson Scale Company, Dept. CP, Van Houten Ave., Clifton, N. J. When inquiring specify 9347 on form opposite last page.

For more information on product at left, specify 9348 . . . see information request blank opposite last page.

More Versatile

Greater productivity is only half the story of the model HA, since it can be readily adapted to do many other jobs on either a part-time or full-time basis. Quickly-attached floor sweeper, fork-lift and pusher-fork attachments, plus

special buckets are available to further increase its usefulness and make this "PAYLOADER" one of the most versatile, profitable machines any plant can own.

The knowledge and experience gained during the past 30 years in building thousands of tractor-shovels — more wheeled tractor-shovels than all others combined — is your assurance of superior design, engineering and performance. The "PAYLOADER" line is also a complete line — a size for every purpose — bucket capacities from 14 cu. ft. to 2¼ cu. yd. There is also a nearby "PAYLOADER" Distributor with complete parts and service facilities.



PAYLOADER®

MANUFACTURED BY
THE FRANK G. HOUGH CO. LIBERTYVILLE, ILL.

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THE FRANK G. HOUGH CO.

744 Sunnyside Ave., Libertyville, Ill.

Send information on "PAYLOADER" tractor-shovels as checked

☐ MODEL HA ☐ LARGER SIZES

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Title _____

Company _____

Street _____

City _____

State _____

Can a Towmotor Solve My Handling Problems?



YES!

Towmotor Fork Lift Trucks and Towmotor Job-Planned Accessories are "tailor-made" for your particular application in many ways. Soundly engineered by materials handling specialists, the Towmotor line includes 15 different models and more than 60 interchangeable attachments, for every handling need.

Ask your nearest Towmotor Representative to show you what Towmotor equipment can do to speed your materials handling, cut man-hour costs and make maximum use of storage space! . . . or write for Certified Job Studies covering your industry. TOWMOTOR CORPORATION, Div. 2312, 1226 E. 152nd St., Cleveland 10, Ohio.

America's best-engineered fork lift truck

THERE'S ONLY ONE FORK LIFT TRUCK CALLED TOWMOTOR

When inquiring check 9349 opposite last page

Read how a company in the Chemical Industry handles materials 500% faster than before.

Ask for Job Study #137

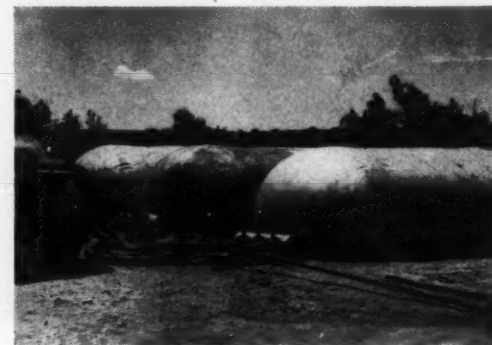
TOWMOTOR
THE ONE-MAN-GANG

MATERIAL HANDLING

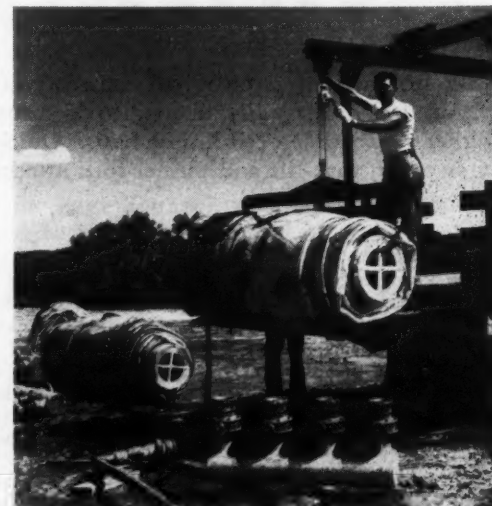
'Whale' size rubber tanks solve storage problem

Tanks are adaptation of fuel cell developed for combat airplanes

Called "whales" by oil men, collapsible rubber storage tanks are being used by Dowell Inc. for temporary storage in the field. Adapted from fuel cell developed for combat planes in World War II, tanks are constructed of rubberized nylon . . . strong, flexible, and resistant to oil and abrasion. Each 15,000 gallon tank, when filled, is 45 ft long, 11 ft wide and nearly 6 ft high. The tank is intended to replace steel tanks for temporary storage of the water, crude and refined oils used by Dowell in several of its well-stimulation processes.



Tanks inflate to 45 ft long



Tanks are rolled up like sleeping bags into neat packages less than 8 ft long

CHEMICAL PROCESSING

MATERIAL HANDLING

Each tank, with its piping and valve, weighs about 1350 pounds. As many as six of them can be carried easily on a small truck equipped with simple hoisting gear to facilitate handling. These tanks can be rolled like sleeping bags into neat, light weight packages less than eight feet long by two and one half feet.

Units have a built-in pressure-release system that prevents rupturing the tank by overfilling and tanks can be filled or emptied at rates as high as 1680 gallons per minute. Each tank is supplied with a repair kit similar to a tire patching outfit.

(Collapsible rubber tanks are manufactured by The Firestone Tire and Rubber Co., Dept. CP, Akron, Ohio . . . or for more information check 9350 on form opposite last page.)

Tells about racks designed for short-term storage

Six-page, two-color bulletin tells how pre-engineered racks can store short-lived inventory, parts in process, palletized loads, different-sized packages, component parts, and others. Bulletin contains complete discussion of "live storage" principle, engineering details, and components available. Illustrations of typical installations are included.

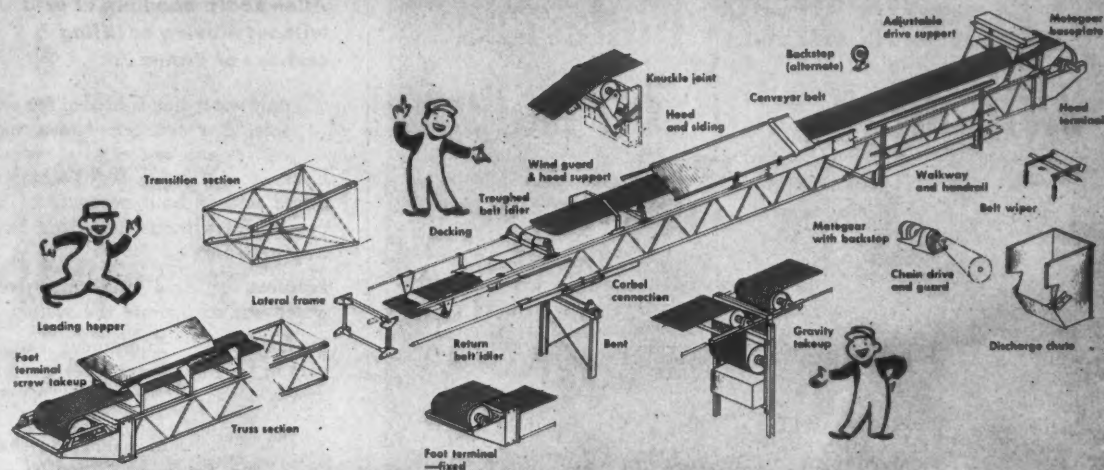
Bul RA-56 is issued by The Alvey-Ferguson Company, Dept. CP, Cincinnati 9, Ohio. When inquiring specify 9351 on form which is located opposite last page.



Mark Larkin

"Post this immediately, Miss Jones—No more overtime for samplers!"

THESE STANDARD COMPONENTS ARE ALL AVAILABLE TO MEET YOUR INDIVIDUAL REQUIREMENTS



NOW! The advantages of engineered belt conveyors in a LINK-BELT PRE-BILT PACKAGE

Standard 18, 24, 30 and 36-inch widths need no special engineering

Here's an economical, standardized belt conveyor "package" . . . ready to meet the majority of belt conveyor needs and perform dependably for years and years. It combines standard Link-Belt products with sectional truss frames and steel supporting bents.

Book 2579 has further data on Link-Belt PRE-BILT conveyors . . . with drives up to 40 hp and 24 and 42-inch truss depths. Write today, or ask for a copy at your nearest Link-Belt office.

easy selection

Your Link-Belt representative will help you select the best combination of PRE-BILT sectional belt conveyor components.

LINK-BELT

BELT CONVEYOR EQUIPMENT

16.114



prompt quotations

He will prepare a comprehensive and accurate estimate of requirements for installations that permit "on-the-ground" survey.

simplified purchase

Parts are standardized, interchangeable, all available from one supplier. Link-Belt representative can furnish all data.

quick delivery

PRE-BILT conveyors are built at nine strategic locations throughout the country and are shipped from the plant nearest you.

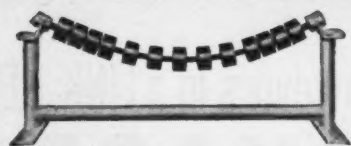
fast installation

Can be readily handled by your own erectors in most cases. Link-Belt can also furnish complete erection service and supervision.

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.

When inquiring check 9352 opposite last page

Handle Sticky Materials Without Buildup on Rolls!



UNIQUE BELT CONVEYOR IDLER
Flexing action of the Joy Limberoller conveyor idler keeps it free of material buildup . . . keeps maintenance to an unheard-of-low.

Belt conveyor maintenance can be a real headache when sticky chemicals and fertilizers start gumming up the idlers. The unique Limberoller belt conveyor idler is completely flexible—made of resilient molded neoprene discs on a flexible steel cable. This flexing action breaks loose any material building up on the rolls—makes maintenance dive 30% to 90%.

The Limberoller has already given over 12 times the service life of conventional idlers in many applications—proved extremely effective in handling triple superphosphate, ammonium sulphate, and sticky fertilizers.

The Joy Limberoller also resists dust, abrasion, and corrosion . . . no bearing trouble because only two bearings are used and these are up out of the dirt zone. Get details from **Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.** In Canada: **Joy Manufacturing Co. (Canada) Limited, Galt, Ontario.**

Write for FREE Bulletin 131-80



For Air and Gas Compressors, Vacuum Pumps and Boosters, Conveyors, Fans, Electrical Connectors, Oil-free Compressors.

WWW 1-8310-131



When inquiring check 9353 opposite last page

MATERIAL HANDLING

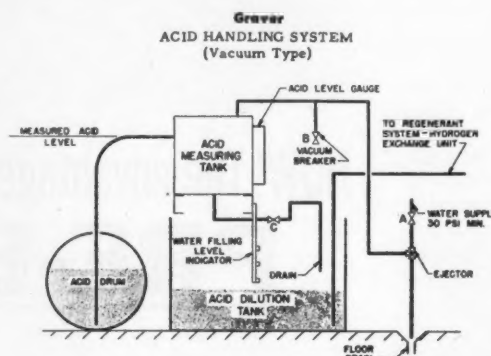
Allows safe handling of acid without moving or lifting carboys or drums . . .

only water line is needed for system designed for safe, easy transfer, measurement, and dilution

Uses: As method to transfer, measure, and dilute acid without necessity of lifting carboys or drums and without subjecting any vessels to positive pressures.

Features: Acid handling system needs only a water line to operate the system, as furnished.

Description: Equipment can be furnished as part of regenerant system of water treatment proc-



Acid handling system uses vacuum provided by plant water system

esses, such as demineralization, hydrogen zeolite ion exchange, and acid stabilization. Acid is drawn from drum or carboy to measuring tank by vacuum created by water operated ejector. When proper amount of water is in tank, flow is stopped by opening a vacuum breaker. Excess acid draws back to supply source. After dilution tank is filled with water, measured acid is drained into dilution tank. Proper amount and concentration of acid is then ready for use in regeneration system . . . or as otherwise desired.

(Vacuum Acid Handling System is product of Graver Water Conditioning Co., Dept. CP, 216 West 14th St., New York, N.Y. . . . or for more information check 9354 on form opp. last page.)



have you noticed?

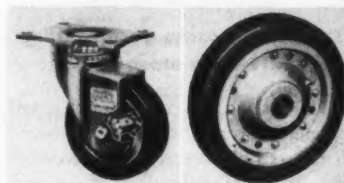
CP is "different" in regards to type of articles it contains. For reasons why . . .

. . . see page 171

**LIGHT, MEDIUM
and HEAVY
DUTY CASTERS**

**Precision-built
DARNELL
CASTERS AND WHEELS**

**for
Better Performance
...longer life!**



These Quality Features!

RUBBER TREADS . . . a wide choice of treads suited to all types of floors, including Darnelloprene oil, water and chemical-resistant treads, make Darnell Casters and Wheels highly adapted to rough usage.

RUST-PROOFED . . . by zinc plating, Darnell Casters give longer, care-free life wherever water, steam and corroding chemicals are freely used.

LUBRICATION . . . all swivel and wheel bearings are factory packed with a high quality grease that "stands up" under attack by heat and water. Zerk fittings are provided for quick grease-gun lubrication.

STRING GUARDS . . . Even though string and ravelings may wind around the hub, these string guards insure easy rolling at all times.



**---you'll
want these
facts**

WRITE FOR A COPY TODAY!

DARNELL CORPORATION, LTD.
DOWNEY (LOS ANGELES COUNTY) CALIFORNIA
40 WALKER STREET, NEW YORK 13, NEW YORK
36 NORTH CLINTON STREET, CHICAGO 6, ILLINOIS

When inquiring check 9355
opposite last page

CHEMICAL PROCESSING

**Material level in bins
is indicated
by light . . .**

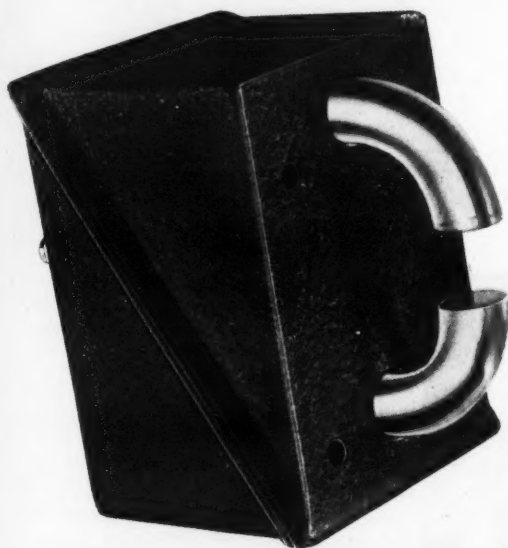
photoelectric unit can control both high or low level

Uses: Sensing device controls bin level of granular materials, flakes, powders, or small dry solids of any type.

Features: Lucite rods conduct light from light source lamp to photoelectric tube, both of which are mounted in a single sensing head.

Description: Installation requires only slots in the bin wall for the Lucite rods and mounting holes for attaching sensing head. It is possible to use gaskets between the bin wall and the unit to assure a tight seal.

When material level rises and covers Lucite rods, light from the lamp is cut off from the photoelectric tube. For low level control, a light-ener-



Installation requires only slots in the bin wall for Lucite rods and mounting holes for sensing head

gized unit is used with sensing head. For high level control a dark-energized unit is used. Both control units have "fail safe" circuits in that failure of the lamp or tube causes the control to energize.

Sensing head is 5 1/4" high x 3 1/4" deep, without Lucite rods. Rods are 3/4" in diameter and extend 1 3/4" from the housing. Control unit is 7 1/2" wide, 5-15/16" high x 4" deep plus mounting feet which extend 2 3/8" from the housing.

(Bin Level control is manufactured by the Auto-tron Co., Dept. CP, Box 722-S, Danville, Ill. . . . or for more information about manufacturer's product, reader may simply check 9356 on form which is located opposite last page.)

BAKER *offers* **LP gas** *fork trucks* *in 2000 to* *7000 lb.* *capacities*



The complete Baker line includes the BAKER LP gas fork trucks for those desiring the cost savings, cleaner operation, and other advantages provided by liquefied petroleum gas.

The Baker LP gas truck is powered by an engine specially designed for LP gas, not just a conversion unit. The special LP engine is provided with high compression head for maximum efficiency. Among the features, are a special cold manifold and hot thermostat for cooler operation. Stellite-faced exhaust valves and solid Stellite inserts assure greater dependability and longer life. Complete vaporization and more efficient combustion mean lower oil consumption, less down time and reduced maintenance costs due to minimum cylinder wear. Fuel tank conveniently located behind the driver can be removed and full tank installed in less than a minute.

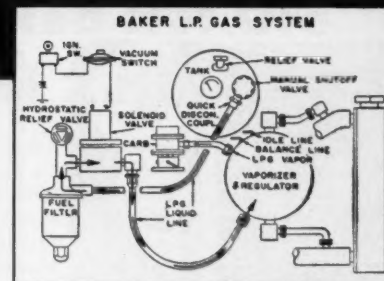
Write for information.

THE BAKER-RAULANG COMPANY
1208 WEST 80th STREET • CLEVELAND 2, OHIO

Baker

handling equipment

A subsidiary of Otis Elevator Company



Arrows trace the flow of LP gas from the tank through the filter to the vaporizer and regulator before it enters the engine. The hydrostatic relief valve opens the system before dangerous pressure is reached in event of high ambient temperature changes. Automatic fuel shut-off is provided by solenoid valve and vacuum switches when engine stops. For maximum efficiency, the vaporizer preheats the LP gas before it passes to the regulator and the regulator reduces the pressure before the gas enters the carburetor.

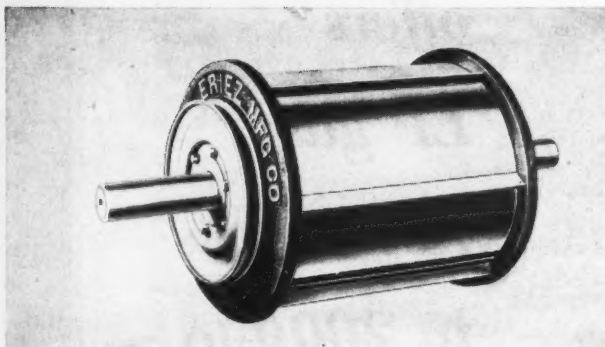
When inquiring check 9357 opposite last page



THE DARING YOUNG GAL ON THE ERIEZ TRAPEZE. Though she swings through the air with the greatest of ease, this pretty aerialist has nothing to worry about. Her rigging is held securely by an Eriez HI-POWR magnet, hung from the ceiling of the gym. This idea of herculean magnetic power has found a practical use in industry, where magnetic separators are used in processing lines to remove tramp iron that could cause fires, machinery damage and product contamination. *All Eriez HI-POWR Magnets are non-electric, self-contained. They operate without any wires or attachments. Their magnetic power lasts a lifetime. The first cost is the only cost.*



Magnetic ideas from **ERIEZ**



YOU CAN'T BEAT THIS DRUM. The self-cleaning Eriez Permanent Magnetic Drum is an unbeatable unit for automatically extracting tramp iron from materials conveyed in spouts, chutes, spiral conveyors, etc. Consisting of units with or without housing, the Eriez HI-POWR Drum is a revolving shell inside of which are powerful Alnico V elements which pull tramp iron from wet or dry material, thereby preventing possible fires or machinery damage . . . and assuring a contamination-free product. For more information on this product, request Bulletin B-601.



FABULOUS FERROTRAP FINDS FINES. Installed in a processing line handling a viscous liquid, this Eriez Magnetic Ferrotrap catches even the most minute particles of unwanted iron. Located just ahead of the mechanical filters and high pressure pumps, the Ferrotrap has eliminated pump and filter failure caused by iron contamination in the liquid. It has also cut maintenance costs by greatly reducing corrosion. Available in standard or sanitary models, Ferrotraps are ideal for removing microscopic fines from liquid lines where product purity is of prime importance. Ferrotraps can be installed in any position, to avoid sump effect. Magnetic element is quickly and easily removed for cleaning.

New! Eriez HI-VI VIBRATORY EQUIPMENT

First complete line of electro-permanent magnetic vibratory equipment operating at 3600 CPM directly off an AC line. No rectifier needed! . . . just plug in. Greater vibratory output with less power consumption. Less maintenance; lower installation costs. Permanently powered guaranteed Alnico V magnetic element (heart of the unit) produces an exclusive "double action" drive for more productivity.



Write for complete information on HI-VI Unit (bin) Vibrators to keep bulk materials flowing freely. HI-VI Vibratory Feeders for accurate, controlled feed.

Patent Pending



A POUND A DAY KEEPS THE REPAIRMAN AWAY. A 36" Eriez HI-POWR Plate Magnet at the Tetley Tea Company plant picks up about a pound a day of nails, bolts, screws and other tramp iron. The Eriez installation protects the bag machinery . . . and is saving about \$5000 a year . . . and is saving about 200 manhours annually . . . and is increasing production! Besides the Plate Magnet shown, four other efficient Eriez Magnets have been in operation at the famous tea plant protecting product purity since 1950.

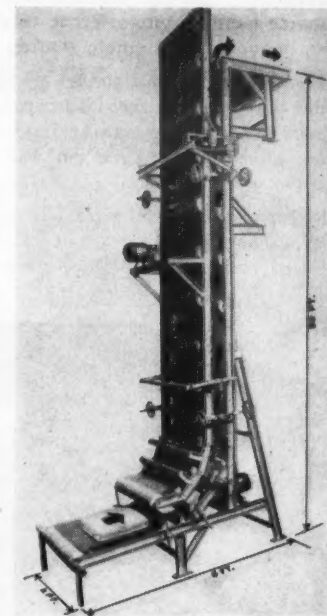
- Eriez' free booklet "Magnetic Ideas" can help you. Send for it without obligation, **ERIEZ MANUFACTURING COMPANY, 73M Magnet Drive, Erie, Pa.** OR on your specific request Eriez factory-trained field men backed by Eriez' laboratory and engineering know-how, will be happy to study your particular problem, make a plant survey and offer helpful "Magnetic Ideas".

MATERIAL HANDLING

Lowers filled bags at controlled speeds

Uses: Elevator is designed to lift or lower bags or packages at any angle or to any level.

Features: Reversible unit receives bags at any level and low-



Elevator base with supports takes 6 feet of horizontal floor space

ers them at controlled speeds . . . prevents breaking or jamming in chute.

Description: Base with support takes only six feet of horizontal floor space.

Belt moves at 140 fpm, handles continuous flow of bags at 30 units per minute.

Bags travel between two independently powered conveying surfaces. Bags can be delivered to any of various levels.

(Bag elevator is manufactured by Power Curve Conveyor Company, Dept. CP, 2185 South Jason Street, Denver 23, Colo. . . . or check 9358 opposite last page.)



For more information on product at left, specify 9359 . . . see information request blank opposite last page.

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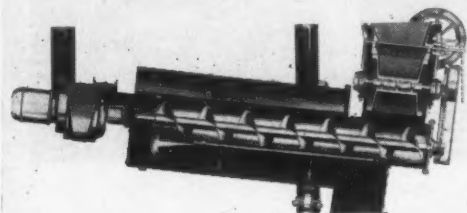
MATERIAL HANDLING

Adds water to dry materials — feeds mixture to trucks or rail cars . . .

unit is suspended from storage bin, controlled from ground level

Uses: Unit mounts under bin, continuously mixes dry material with water and discharges properly moistened mixture.

Features: Suspended from base of a storage bin, unit is controlled from ground level rather than from a raised platform. This permits operator



As wetted material travels towards discharge end, it is mixed by combined action of rotating drum and stationary scraper

to watch discharge and regulate conveniently located water and feed controls, insuring correct material-water consistency.

Description: Unit is self-contained and may be lowered by a hoist for maintenance and overhaul at convenient ground level. Rotary feeder is used to control flow of fine grain material to unit. Adjustable feed control baffle is used for dry mixtures of larger material size.

In operation, dry material enters unit through rotary feeder. A screw-conveyor carries it to high end of mixing drum. Single jet of water impinges on a splash plate near high end of drum and wets dry material as it enters. As wetted material travels toward discharge end, it is mixed by combined action of rotating drum and stationary scraper.

(Mixer-unloader is manufactured by Allen-Sherman-Hoff, Dept. CP, Wynnewood, Pa. . . . or for more information check 9360 opposite last page.)

Shows industrial tractors

Catalog of 24 pages shows, in two colors, details of manufacturer's line of industrial tractors and attachments. Specifications are given on each model shown.

"Work Bulls" is issued by Massey-Harris Division, Massey-Harris-Ferguson, Inc., Dept. CP, Quality Ave., Racine, Wisconsin. When inquiring specify 9361 on form opposite last page.

CARRIER does the "IMPOSSIBLE" for the biggest names in industry!



60 Tons-Per-Hour of Red Hot Ore Handled by a Cool 2 HP!

WHEN a large eastern steel company ordered this heavy duty Carrier Feeder, trouble-free performance was their chief requirement, since it was to be installed in a key position in their sintering plant. It had to handle up to 60 tons per hour of 1800° F. materials, with virtually no maintenance—a task which it has taken in stride!

There's a reason why Carrier Natural-Frequency Feeders need less maintenance. Unlike magnetic or any other kind of "brute-force" vibrating equipment, Carrier Feeders utilize the enormous forces of *Natural-Frequency spring action*. In the 2 HP feeder shown above, the coil springs are excited by a 15-lb. weight—and actually generate an alternating force of 3½ tons!

This large force is distributed evenly

along the whole length of the feeder. Internal stresses are very low and are not concentrated at any one point. Bearing loads are low since the drive shaft supports only the small exciting weight—neither the feeder nor conveyed load weights are supported by the bearings at any time.

Average conveyed material temperature is 1800° F. Changes in temperature do not warp or distort the Carrier Feeder. A special high temperature design makes it possible for the overlapping feeder trough sections to expand and contract as required—without any

build-up of internal thermal stresses. Except for the drive motor, Carrier Feeders are completely mechanical, making maintenance a simple matter. Trough sections are easy to remove and can be replaced at any time with a spare from your own shop.

Design features such as these result in a feeder capable of continuous, trouble-free, economical operation in the most rugged of installations.

Carrier Natural-Frequency Feeders can reduce your maintenance and operating costs. Let us send you complete information.

CARRIER NATURAL-FREQUENCY- CONVEYORS

Carrier Conveyor Corporation
285 North Jackson Street, Louisville 2, Kentucky

When inquiring check 9362 opposite last page



- Laboratory wares of all description.
- Platinum Metal Catalysts — Concentrated forms and on carriers.
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PALLADIUM, IRIIDIUM, OSMIUM, RHODIUM,
RUTHENIUM, SILVER AND GOLD

We pay highest prices for scrap platinum and also have facilities for prompt recovery of spent platinum and palladium catalysts

WE INVITE YOUR INQUIRIES. OUR FOLDER CP-20 "PLATINUM, GOLD AND SILVER FOR SCIENCE INDUSTRY AND THE ARTS" WILL BE SENT ON REQUEST.

THE AMERICAN PLATINUM WORKS

231 NEW JERSEY R. R. AVE., NEWARK 5, N. J.
PRECIOUS METALS SINCE 1875

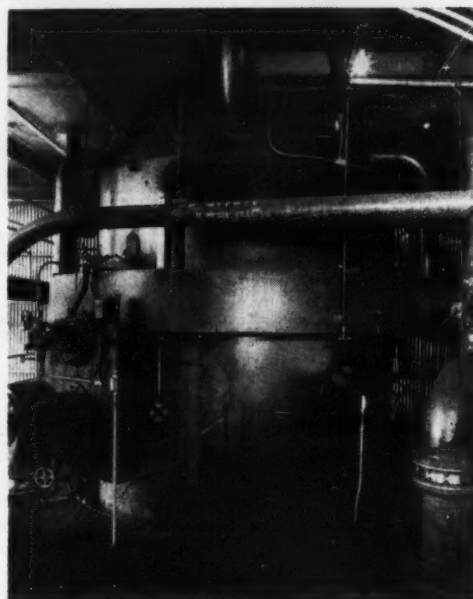
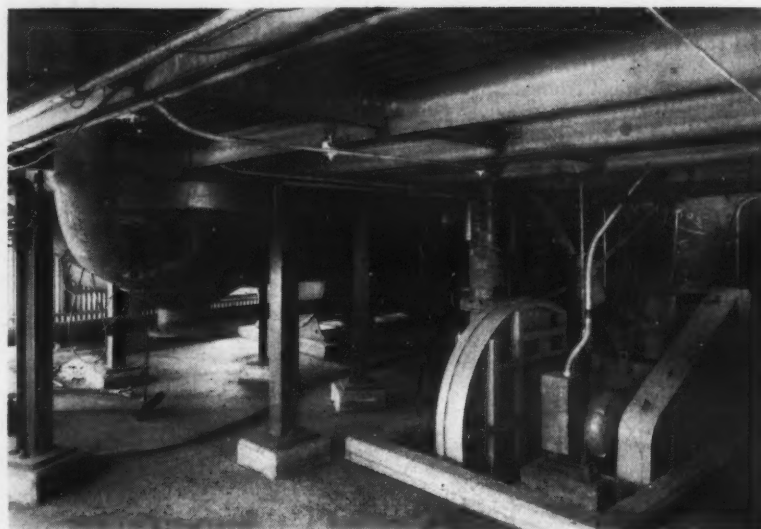
ENGELHARD INDUSTRIES

When inquiring check 9363 opposite last page

ideas — from other industries and nuclear field . . .
new trends in research processes, services

Coal to be used as fuel is ground in pulverizer (right). Bottom of combustion chamber can be seen at left ▶

Lower section of system at Lynnville, showing air heater with bustle pipe at mid-level ▼



FINE coal is successfully being dried by the use of fluidized techniques at Lynnville Coal Company, Lynnville, Indiana. In operation since July 1955, system is reported to be the first commercial application of fluidization to this particular field. (See **CHEMICAL PROCESSING**, May 1956, pages 12-13, for story on fluidized drying of limestone.) Operating on 1/4" x 0 coal, the plant is currently processing 100 tons an hour, using about 22,000 cfm of low-pressure air.

Primary component of the drying system is a two-compartment 7'-diameter reactor. In the lower,

coal drying by fluidization

TED F. MEINHOLD, Assistant Editor

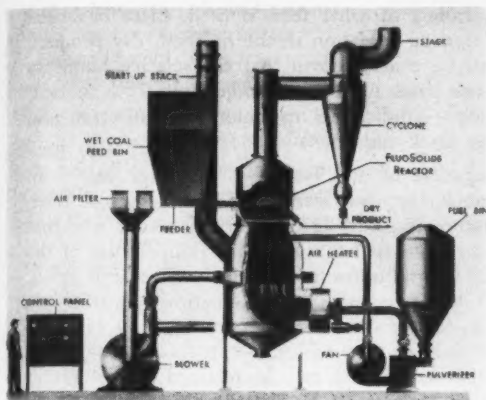
With **A. P. MASSMANN**, Coal Preparation Engineer
Lynnville Coal Company, Lynnville, Indiana

non-fluidized combustion chamber, pulverized coal is burned to produce the necessary heat for drying. Located directly above is the fluidized drying compartment, separated from combustion chamber by a stainless steel constriction plate. Wet coal is introduced into the fluid bed by a screw conveyor. Coarse, dried product is discharged just below fluid bed level. Fine, dried material (minus 28 mesh) entrained in exit gases is collected in cyclones.

In operation, coal to be used as fuel is ground in a pulverizer and blown by a mixture of fresh air and recycled hot gases into the air heater, where it is ignited. After combustion in lower section of bottom compartment, tempering air is introduced through a bustle pipe around the chamber. Resulting mixture of gases heated to 1150°F rises into the drying compartment, fluidizing the bed of coal and holding the particles in suspension. Incoming feed is brought up to 150-160°F almost

CHEMICAL PROCESSING

General arrangement of equipment for fluidized drying of coal. Lynnville installation has four cyclones



A departure from conventional techniques, drying system at Lynnville, Indiana, has now been operating long enough to be properly evaluated. Installed in July 1955, results show that it is the first successful application

immediately, driving off the moisture quickly. Dried products may be either segregated, if desired, or recombined.

One of the important features of the system is its versatility. At Lynnville, both steam coal (for producing steam for electric power) and metallurgical coal (for producing iron and steel) have been dried successfully. Sulfur contents for these two types of coal have ranged from 0.6 to 4%, and inherent moisture from 3 to 9%. This has made no difference in the drying technique or operation of the equipment. Although originally developed to dry $\frac{1}{4}$ " x 0 coal, the dryer has proved that it can also process $1\frac{1}{2}$ " x 0 coal with the same efficiency.

Frequent checks on the feed rate have shown that the unit has handled as little as 69 and as much as 107 tons per hour. Feed moistures for steam coal have been about 18-22% total moisture. Corresponding product moisture has been 10-12%. Metallurgical coal having initial moisture content of 8-9% has been reduced (to meet the required specifications for this type of coal), to 2-3% moisture. Based on Lynnville's cost of power, fuel,

(Please turn to next page)

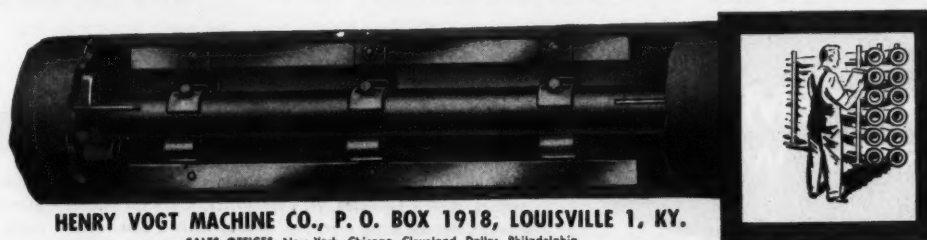
Have You a Special Heat Transfer or Chiller Problem?



Send for Bulletin PE-1 today.
Address Dept. 24A-RICP

Has the answer in its
Scraped Surface Exchangers

OTHER VOGT PRODUCTS: Drop Forged Steel Valves, Fittings and Flanges in a complete range of sizes • Petroleum Refinery and Chemical Plant Equipment • Steam Generators • Heat Exchangers • Ice Making and Refrigerating Equipment.



HENRY VOGT MACHINE CO., P. O. BOX 1918, LOUISVILLE 1, KY.

SALES OFFICES: New York, Chicago, Cleveland, Dallas, Philadelphia,
St. Louis, Charleston, W. Va., Cincinnati, San Francisco

When inquiring check 9364 opposite last page

HAMMOND IRON WORKS

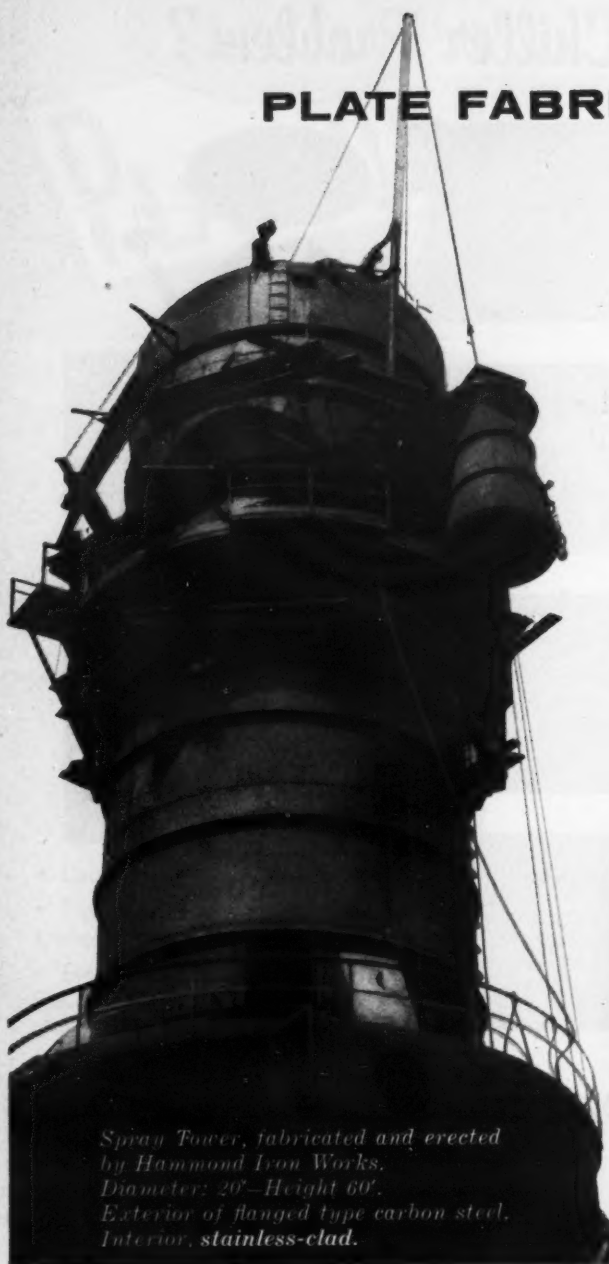
PLATE FABRICATION

AND ERECTION

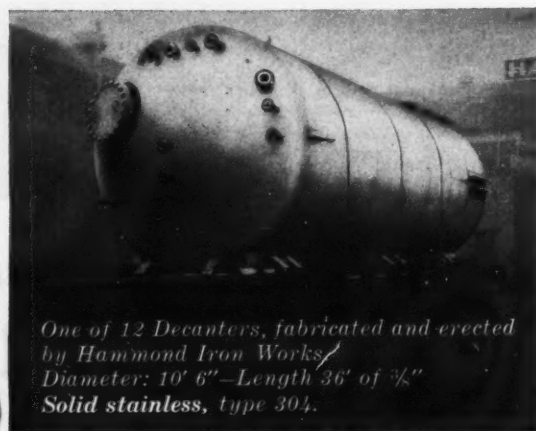
of Vessels, Tanks, Towers, odd and intricately designed chemical equipment...to any size...of any material: steel, aluminum, stainless, stainless-clad, special alloy, etc.

HAMMOND has a background of more than 50 years' successful service to the chemical industry. With its 5 plants and its know-how, based upon experience, no job is too large or too small for Hammond.

Catalog 54B illustrates the Hammond story
... write for your copy.



*Spiral Tower, fabricated and erected by Hammond Iron Works.
Diameter: 20'-Height 60'.
Exterior of flanged type carbon steel.
Interior, stainless-clad.*



*One of 12 Decanters, fabricated and erected by Hammond Iron Works.
Diameter: 10' 6"-Length 36' of 3/4"
Solid stainless, type 304.*

HAMMOND IRON WORKS

WARREN and BRISTOL, PA. • PROVO, UTAH • CASPER, WYO. • BIRMINGHAM, ALA.

Sales Offices: NEW YORK • BOSTON • CHICAGO • SAGINAW • MICHIGAN • CINCINNATI
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When inquiring check 9365 opposite last page

IDEAS

Coal Drying

(Continued from preceding page)

and labor, average operational cost has been calculated to be about 11 cents per ton of wet feed. Regardless of what feed is used, there has been no sign of oxidation in the finished, dry product. Tests have also shown that the relative humidity of exit gases (at 140°F) range from 92% to saturation — indicating maximum air utilization and clean stack conditions.

Operation of the system is dust-free and continuous. Only one man per shift is required. Temperature is controlled by varying either wet coal feed rate or fuel consumption. Temperature of the fluid bed is uniform, with no localized hot spots, and can be controlled automatically within 10-20°F. Shutdowns present no problem. It is necessary only to turn off fuel, stop feeding, and shut off blower. Reactor may be returned to normal operating temperature by starting blower, turning on and igniting fuel, and resuming feeding.

Because there are no moving parts which are exposed to high temperatures inside the reactor, scaling and maintenance are kept to a minimum. Space requirements are low too. Entire drying system occupies only 1350 sq ft.

(FluoSolids system was developed by Dorr-Oliver Incorporated, Dept. CP, Barry Place, Stamford, Conn. Check 9366 on form opposite last page.)

National Bureau of Standards to move Washington labs...

new location to be near Gaithersburg, Maryland; has occupied present site since 1903

A tract of approximately 550 acres of land near Gaithersburg, Maryland, has been selected for relocation of the Washington laboratories of the National Bureau of Standards. Move will permit the Bureau to plan new buildings to replace present research facilities, which over the past 50 years have become inadequate for current needs.

New site was selected, after careful consideration, as most suited to the special requirements of the Bureau's scientific and engineering programs. Choice was based upon a number of factors, including accessibility by railroad and highway as well as topography for certain technical projects.

The Bureau has occupied its present site on Connecticut Avenue in Washington, D. C., since 1903. Transfer of operations to the new location is expected to be completed in about five years. In addition to its Washington laboratories, the Bureau maintains a major research center in Boulder, Colorado, and 20 widely scattered field stations.

(Information courtesy of National Bureau of Standards, Washington 25, D. C.)

Lease, credit plans offered on mills and mixers

Manufacturer of dispersion mills and mixers has announced lease and credit plans for his equipment. Plans offer prospective buyers use of the equipment without expending great amount of capital.

Under lease plan the only cash required is one month's rental for each year. Rentals range from one to two percent of original equipment cost. Lease is renewable indefinitely from year to year at reduced rates.

To initiate credit plan, a 25 percent minimum down payment is required. Payment on unpaid portion can then be geared to user's own methods of calculating depreciation.

(Lease and credit plans are offered by Morehouse-Cowles, Inc., Dept. CP, 1150 San Fernando Road, Los Angeles 65, California . . . or for more information reader may check 9367 on the Reader Service slip located opposite last page.)

Magnesium proposals sought by AEC

Proposals are being invited for supplying the AEC with 2000 to 3500 tons of magnesium during the one-year period beginning July 1, 1957. Proposals may be submitted for either ingot or ground magnesium or both. Alternate or additional proposals will be considered for the five-year period beginning July 1, 1958. Annual tonnages for the latter are estimated to be the same as for the one-year period. Deadline for submission of proposals is November 16, 1956.

(Further information and invitations for proposals can be obtained by writing to Contract Board, U.S. Atomic Energy Commission, Post Office Box E, Oak Ridge, Tenn.)

For more information on product at right, specify 9368 . . . see information request blank opposite last page.



PROPERTY AND APPLICATION DATA
ON THIS VERSATILE ENGINEERING MATERIAL

NEWS

Bearing buttons of TEFLON® eliminate lubrication in valve handling corrosive fluids

Bearing buttons of TEFLON tetrafluoroethylene resin make this unplasticized polyvinyl chloride plug valve, used in piping corrosive fluids, permanently "self-lubricating". The exceptionally low coefficient of friction of TEFLON ($f = .04$) assures ease of turning, and prevents seizing and galling.

The buttons are designed as inserts in the valve spindle. In the closed position, the buttons provide a chemically inert block across the open diameter of the pipe. A seal of TEFLON is used on the valve shaft to prevent external leakage.

This valve has been operating for more than a year in concentrated HCl at room temperature. The user reports that no problems of corrosion, sticking or lubrication have occurred at any time so far.

TEFLON resists all chemicals normally encountered in industry. Exceptions to this are metallic alkali metals, under certain conditions. At elevated temperatures and pressures, halogens and certain halogenated chemicals and solvents may affect TEFLON.

DuPont TEFLON remains tough through a wide range of temperatures. It has no water absorption. Sticky or viscous materials do not adhere to its waxy surface. TEFLON is specified for electrical uses be-



Vital components of Du Pont TEFLON (shown in red) are utilized in this polyvinyl chloride plug valve (patent pending) manufactured by Tube Turns Plas-

tics, Inc., Louisville, Kentucky. Shown above is an exploded view of the valve based on a transparent mock-up made of Du Pont LUCITE® acrylic resin.

cause of its high dielectric strength and extremely low power factor. The combination of these properties gives TEFLON unique advantages in a broad range of applications.

It will pay you to investigate the many possible uses for Du Pont TEFLON. For data on this outstanding engineering material, available to you without cost or obligation, clip and mail the coupon below.

TEFLON®

is a registered trademark

TEFLON is the registered trademark for DuPont tetrafluoroethylene resin, and should not be used as an adjective to describe any other product or any component part; nor may this registered trademark be used in whole, or in part, as a trade name for any product.

NEED MORE INFORMATION?

For basic data on the properties and applications of Du Pont TEFLON, mail the coupon.

E. I. du Pont de Nemours & Co. (Inc.), Polychemicals Department
Room 7812, Du Pont Building, Wilmington 98, Delaware
In Canada: Du Pont Company of Canada Limited, P.O. Box 660, Montreal, Quebec

Please send me complete property and application data on Du Pont TEFLON.

I am interested in evaluating this material for

Name _____
Firm Name _____
Position _____
Type of Business _____
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FOR CATALYTIC REFORMING

4 B&W Refractory Castables with low iron content

B&W Kaocast

Ten years ago, B&W introduced this 3000° castable which offers a combination of high temperature use limit, as well as very low iron content. B&W Kaocast can either be gunned or cast in place.

B&W Kaocrete-LI

After two years of extensive field service, B&W adds Kaocrete-LI to low iron content castables. B&W Kaocrete-LI, which has an iron content of less than 1%, has exceptionally high strength for resistance against abrasion and erosion. It has sufficient refractoriness for use at temperatures to 2700 F. Suitable for both gunning and casting.

B&W Kaolite-LI

Another new castable with over two years of field service, B&W Kaolite-LI has high insulating properties due to its light weight (only 59 pounds per cubic foot). Its iron content is also less than 1%. It is designed to be applied with a cement gun only. Installation and maintenance time can be cut since Kaolite-LI does not require water curing and heat can be applied directly after gunning.

B&W Kaocrete-32

Developed for special high temperature service, B&W Kaocrete-32 has extremely high strength and a use limit of 3200 F. It can be poured, plastered or gunned into place.

Properties of B&W Low Iron Content Castables

| | | B&W Kaocast | B&W Kaocrete LI | B&W Kaolite LI | B&W Kaocrete 32 |
|---|--------|----------------|-----------------------|----------------------|-----------------------|
| Use limit, °F | | 3000 | 2700 | 2300 | 3200 |
| Melting point, °F | | 3200 | 3100 | 2700 | 3297 |
| Average density lb/cu ft after firing | | 126 | 131 | 59 | 134 |
| Average % Fe ₂ O ₃ | | 1.0 | 0.9 | 0.8 | 1.0 |
| Cold crushing strength— psi average— after heating for 5 hrs. at: | 1000 F | 700 | 2500 | 350 | 1000 |
| | 1500 F | 500 | 2500 | 350 | 800 |
| | 2000 F | 400 | 1200 | 300 | 750 |
| | 2200 F | 500 | 1300 | 450 | 1000 |
| | 2400 F | 500 | 1600 | — | 2000 |
| | 2600 F | 1000 | 6000 | — | 3000 |
| | 2800 F | 2200 | — | — | 3500 |
| | 3000 F | 3500 | — | — | 4000 |
| | 3200 F | — | — | — | 5000 |
| Permanent linear shrinkage— average % less than— after heating for 5 hrs. at: | 1000 F | 0.3 | 0.2 | 0.3 | 0.2 |
| | 1500 F | 0.3 | 0.2 | 0.4 | 0.2 |
| | 2000 F | 0.5 | 0.2 | 0.4 | 0.2 |
| | 2200 F | 0.5 | 0.2 | 0.6 | 0.4 |
| | 2400 F | 0.5 | +0.1 | — | 0.5 |
| | 2600 F | 0.5 | — | — | 0.5 |
| | 2800 F | 0.5 | — | — | 0.5 |
| | 3000 F | 0.3 | — | — | 0.2 |
| | 3200 F | — | — | — | 0.1 |

Consult your B&W Representative for additional information on these and other B&W Refractories for the refining industry.

B&W REFRACTORIES PRODUCTS: B&W Allmul Firebrick • B&W 80 Firebrick • B&W Junior Firebrick • B&W Insulating Firebrick • B&W Refractory Castables, Plastics and Mortars • B&W Silicon Carbide

**BABCOCK
& WILCOX**

THE BABCOCK & WILCOX CO.
REFRACTORIES DIVISION
GENERAL OFFICES: 161 EAST 42ND ST., NEW YORK 17, N.Y.
WORKS: AUGUSTA, GA.

IDEAS

Butane converted to gasoline by use of atomic energy

Gasoline has been synthesized from butane by bombarding the liquefied hydrocarbon with a beam of electrons. Using an electron accelerator and a butane reaction



Drs. Keenan, Lincoln, and Rogers at the control panel of electron accelerator with which they've converted butane to octane

vessel, the process produces octane with a minimum of undesirable by-products, which may simplify the refining steps now used in conventional processes. Studies are continuing to determine commercial feasibility of method.

(Development work is being conducted at The Atlantic Refining Company, Dept. CP, 260 South Broad Street, Philadelphia 1, Pa.)

Lists over 3000 AEC Reports

Latest price list of Atomic Energy Commission unclassified research reports contains 1034 items acquired since January 1, 1956. The cumulative listing includes more than 300 reports.

AEC research report Price List 26 is issued by Office of Technical Services, US Dept. of Commerce, Washington 25, D. C.

For more information on product at left, specify 9369 see information request blank opposite last page.

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**'Silent Sam', the smog sleuth,
at work in California . . .**

1300-lb instrument expected to expose hitherto undetectable pollutants existing in air

One of the latest recruits in the fight against smog in Los Angeles is "Silent Sam", the super smog sleuth. Conceived and built by the Franklin Institute in Philadelphia, "Sam" was brought to California in a 35-ft mobile laboratory trailer to analyze smog with his ultra-long-path infrared absorption cell and spectrometer.

The pollutant-detecting instrument is 17-ft tall and weighs 1300-lb. "Sam" consumes air in 22-cu ft gulps. His "stomach" is a 200-in diam, 10-ft long stainless steel tube, into which atmospheric samples are pumped. Infrared radiations bounce back and forth through these samples, and an analyzer separates them into colors and measures the strength of each.

"Sam" can detect and identify smog impurities as unerringly as fingerprints can pinpoint a lawbreaker. He is expected to expose hitherto undetectable pollutants which exist in minute sizes and amounts in the atmosphere. He is starting his investigation at the Stanford Research Institute laboratory in South Pasadena. It is here that the Air Pollution Foundation is conducting one of its key research projects on the role of automobile exhaust in eye irritation, plus studies of atmospheric aerosols and gases responsible for various manifestations of smog.

(Information courtesy of Air Pollution Foundation, Dept. CP, 704 South Spring Street, Los Angeles 14, California.)



"I've still got the fall-out problem to lick."

Sherman L. Peeno, Procter & Gamble Co., Cincinnati, Ohio, sent us this cartoon.

TYGORUST



**locks vinyl top coats to damp
or dry rusted steel**

**This FREE Painting Manual
can help make your fight
against
corrosion
easier**



Contains a wealth of practical data in its many sections: how to simplify surface preparation; what top coating to use for over one hundred corrosive conditions; how many coats; how to maintain coatings in good condition; common spraying troubles and how to remedy them. It's free on request. Ask for the Tygon Painting Manual.

- Holds surface preparation to a minimum
- Can be top coated within an hour

Tygorust Primer licks the big problem in using vinyl-based protective coatings: **Adhesion**. Not only does Tygorust assure a well bonded top coat to the steel it is to protect, but it does it economically.

Forget sandblasting. Tygorust actually works better on rusted surfaces. Just wire brush loose or flaky rust and apply Tygorust. The steel can be dry or damp—it makes no difference. (You can brush or spray Tygorust on dry steel—damp steel should be brushed.) Use Tygorust on concrete, too.

You can overcoat Tygorust with any finish material; but for real corrosion-resistance, make the finish coats Tygon—the corrosion-resistant paint that has stood the test of time.

Plastics and
Synthetics
Division

U. S. STONEWARE

AKRON 9, OHIO

342E-1

When inquiring check 9370 opposite last page

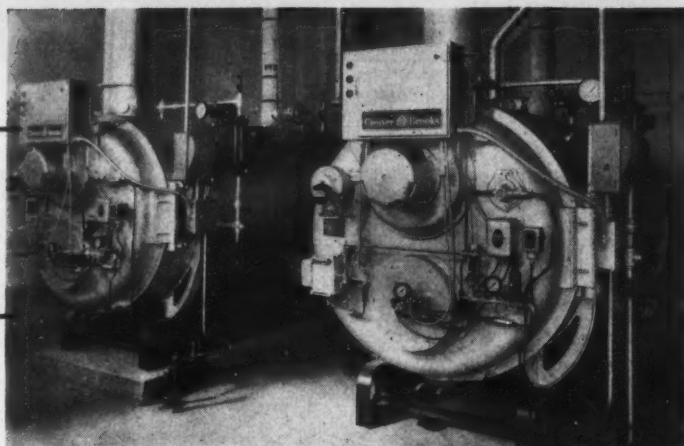
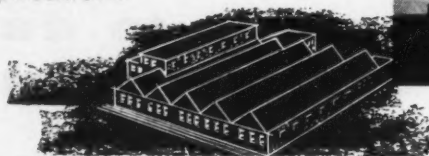
18 sizes

110 models

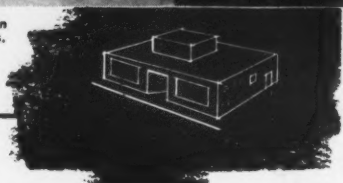
15 to 600 hp

yours from Cleaver-Brooks

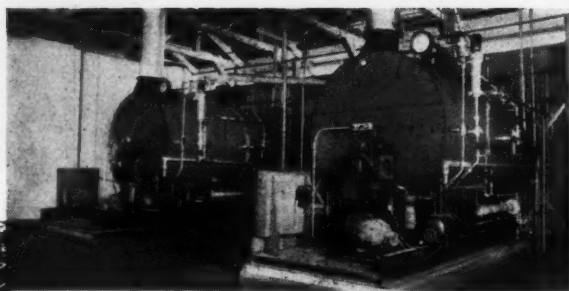
the broadest line of
cost-saving "packaged"
boilers—for hundreds of
applications



CB SERIES — The ultimate in compact, quiet-running boilers. Sizes: 15 to 150 hp.



LR SERIES — Standard of the industry for hot water or steam service, for heating or processing. Sizes: 200 to 600 hp.



THE two installations above are representative of Cleaver-Brooks' broad range of standard models. The wide choice makes planning and selection of a boiler for your specific needs — large or small — a simple, time-saving procedure.

Your nearby Cleaver-Brooks representative, with years of specialized boiler experience, can be of real service to you. Working with you and your engineers, he can help you to find ready answers to questions of size, loads, present and future steam or hot water needs, space and equipment arrangement. Where local conditions dictate, oil, gas or combination oil/gas firing can be selected for greatest savings. And once installation is com-

pleted, arrangements are made for factory-supervised starting and training your operator.

Keep in mind, too, the many fuel and maintenance-saving advantages of four-pass design with forced draft . . . the standard equipment electronic combustion controls which assure continuous, safe operation.

Cleaver-Brooks boiler owners enjoy all these advantages and share in the combined application engineering experience of more than 19,000 individual boiler installations. Put this experience to work for you. Cleaver-Brooks Company, Dept. P, 349 E. Keefe Ave., Milwaukee 12, Wis., U.S.A., Cable Address: CEEBEEWEST — all codes.



See the classified pages of your phone directory for name of nearest representative. Send us your name to receive regular issues of the new Cleaver-Brooks Bulletin, or write for newest literature.

Cleaver-Brooks®

TWENTY-FIVE YEARS OF LEADERSHIP
BY THE ORIGINATORS OF THE SELF-CONTAINED BOILER

When inquiring check 9371 opposite last page

IDEAS

Canadian low grade uranium ore having less than 0.10% U_3O_8 concentrated . . .

uranium present in rock as small uraninite crystals; diameter of crystals is only 0.2 mm

Tests carried on at the University of Saskatchewan, Saskatoon, Canada, indicate that low grade uranium ore from the northern Saskatchewan area can be successfully beneficiated to make its economic development possible. Taking a long term view of the potential importance of such uranium resources, the Saskatchewan Research Council has financed the investigations.

Samples investigated contained less than 0.1% U_3O_8 . The predominate minerals in this type of pegmatitic uranium ore are feldspar and quartz. Considerable amounts of biotite and smaller amounts of other minerals are also present. The uranium occurs as small crystals of uraninite disseminated in the rock. These crystals average about 0.2 mm in diameter, and are believed to be associated with the biotite.

The investigations have shown that the low grade material can be effectively leached by treating the crushed rock with about 40 lb of concentrated H_2SO_4 per ton of ore for periods of from 48 to 72 hours. The pregnant solution is particularly free from impurities that might interfere with an ion exchange recovery process.

The possibility of beneficiating the ore by flotation has been extensively investigated. Concentration ratios of from 3.8 to 5.1 with from 75 to 85% recovery of U_3O_8 , were obtained in rougher concentrates. The most successful combination of flotation reagents found involves use of sodium hexametaphosphate as a conditioner, sodium myristate or palmitate as a collector, and oleic acid as a frother.

(Summarized from paper presented at the Annual Conference of the Chemical Institute of Canada, Montreal, May 1956, by A. B. Van Cleave, Department of Chemistry, University of Saskatchewan, Saskatoon, Canada.)

Five major chemical processes reviewed in 12-page catalog

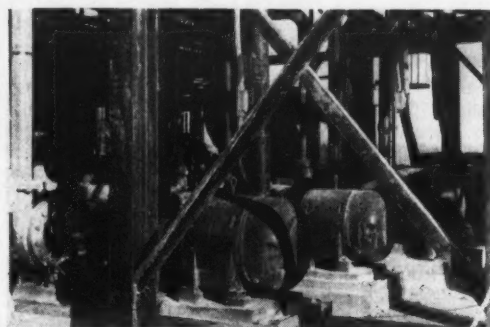
Plants for the manufacture of alkyd resins, fatty alcohols, phenolic resins, and maleic anhydride, and for fatty acid hydrogenation are described in 12-page brochure. Particular attention is given to the variables and factors which are most critical to efficient and economical operation. Typical flow sheets, piping layouts, equipment designs, and installations are illustrated.

Catalog is issued by Industrial Process Engineers, Dept. CP, 8 Lister Avenue, Newark 5, N. J. When inquiring specify 9372 on form opposite last page.

No corrosion, minimum leakage on pumps handling phosphoric acid for five years . . .

Durametallic seal in place of packing gland lowers maintenance

Corrosive phosphoric acid has been handled successfully for five years without visible corrosion by 20 horizontal centrifugal pumps at Westvaco Mineral Products Div., Food Machinery and Chemical Corp., Lawrence, Kansas. Pumps, which are fabricated of 316 stainless steel, employ Durametallic mechanical seals in place of packing glands. This arrangement lowers maintenance and minimizes leakage problems.



CP Staff Photo
Chemical pumps in phosphoric acid service at Westvaco

Largest pumps in service at Westvaco have an 8" discharge, a capacity of 1600 gpm, and 80 psi discharge pressure. These units use 125 hp electric motors, direct-connected through flexible coupling. Smaller pumps in service at the plant have 6" discharge, capacity of 700 gpm, and 25 psi discharge pressure. In addition to the 20 pumps handling phosphoric acid, 10 more are used in plant for sodium phosphate liquor.

Pump is a horizontal, centrifugal type with vertically split case. It is designed with semi-open impeller, which keeps solids from building up in any portion of case. Pump is equipped with two heavy-duty, deep-groove bearings, grease-lubricated or oil-lubricated according to operating temperature. Two removable case wear rings protect case and case back-head from wear at impeller hubs.

(Type DSO chemical pumps are product of Peerless Pump Div., Food Machinery and Chemical Corp., Dept. CP, 301 West Ave. 26, Los Angeles 31, Calif. Check 9373 opposite last page.)

Your guide . . . to more processing ideas and equipment is the alphabetical product directory beginning on page 205

Unique combination of fine engineering and economy!

**...the new
FOXBORO**

M/44

**INDICATING
PRESSURE
TRANSMITTER**

- Easier to Read . . . large indicator scale, visible at 20 ft.
- Easier to Calibrate . . . simple adjustments "on location"
- More Compact . . . single, integral instrument

Any way you look at it, the new Foxboro M/44 Pneumatic Pressure Transmitter gives you an unmatched combination of fine engineering and economy. First; because it is an engineered instrument. There are no attachments or "makeshifts". Second; because it utilizes standard Foxboro parts throughout—parts which have been performance-proved in thousands of successful installations of other Foxboro Instruments. And this means not only top performance, but easier servicing and stocking as well. Third; calibration is simple, right in the field, because the M/44 is "convenience-designed" by men with years of experience in every phase of instrument design and application.



In appearance, too, the M/44 has unmistakable Foxboro quality. Features like the high-legibility indicator scale, the compact drawn-steel case with tough polyester plastic cover. It's the neat, high-efficiency, low-cost pressure transmitter for centralized operation or control. All standard ranges.

Write for complete details
THE FOXBORO COMPANY
8112 Neponset Ave., Foxboro, Mass.

FACTORIES IN THE UNITED STATES, CANADA, AND ENGLAND

FOXBORO

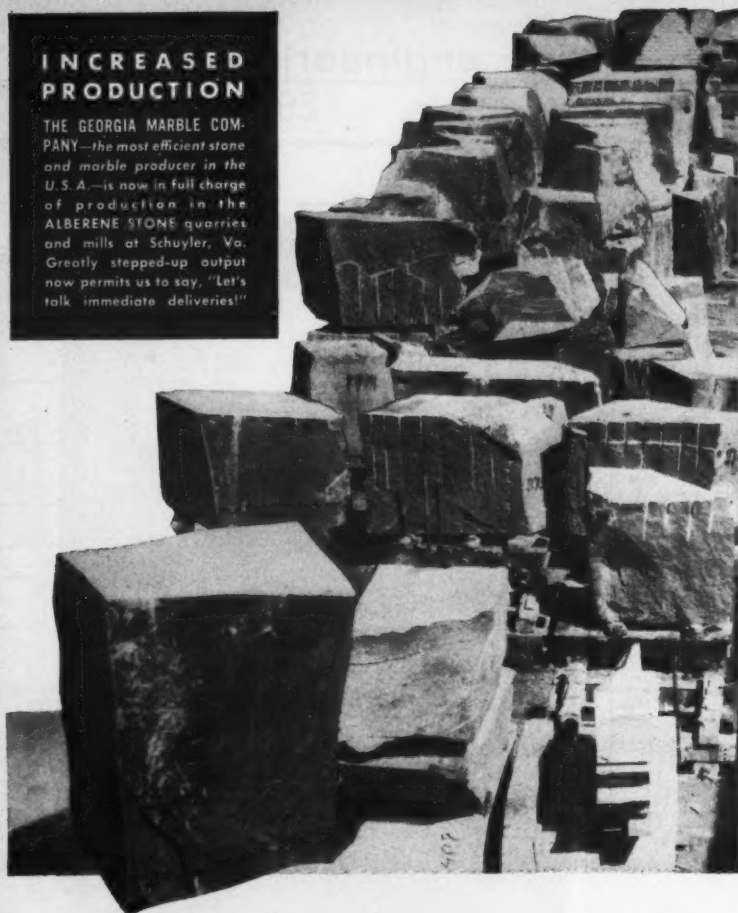
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INSTRUMENTATION FOR INDUSTRY

When inquiring check 9374 opposite last page

INCREASED PRODUCTION

THE GEORGIA MARBLE COMPANY—the most efficient stone and marble producer in the U. S. A.—is now in full charge of production in the ALBERENE STONE quarries and mills at Schuyler, Va. Greatly stepped-up output now permits us to say, "Let's talk immediate deliveries!"



Immediate Deliveries!

Alberene Stone can be shipped normally in 90 days—or even sooner to meet very special circumstances. We can schedule our deliveries to meet all reasonable requirements of contractors and laboratory equipment manufacturers.

Further, the supply of Alberene Stone is inexhaustible. New veins are constantly being located in company owned quarries in Albermarle and Nelson Counties, Va.

Alberene Stone is the only natural silicate stone with the surface that goes all the way thru. It can be cut, drilled, tongue-and-grooved, refinished and reused almost indefinitely — while providing the best obtainable chemical resistance!

For information and technical assistance, address: Alberene Stone Corporation, 419 Fourth Avenue, New York 16, N. Y.

ALBERENE STONE

provides LOW ABSORBENCY protection

When inquiring check 9375 opposite last page

IDEAS

Tubular fuel element ups reactor power 50 percent

Heat transfer surface is 66 percent greater than on conventional flat-type elements

Nuclear fuel element has been developed that is capable of boosting the operating power of some reactors as much as 50 percent, still maintain the same film boiling safety factor. Tubular in shape, the element is made of small, thin wall tubing. It can best be described as a tube within a tube, with the nuclear fuel between the two tubes. Control rod can be inserted into center hole.

Tubular shape has a number of advantages over flat-type elements: 1) heat transfer surface is almost 66 percent greater; 2) metal-to-water ratio is 52 percent lower; 3) flow velocity and pressure drop are reduced; 4) structural strength and rigidity is greater, especially when tubes are grouped in bundles; and 5) fuel is more evenly distributed.

A single tube bundle may have up to 100 tubular elements. Size of the reactor core determines number of bundles that can be used. A tubular fuel element core is fabricated in such a way that individual bundles can be removed and replaced as necessary.

The new fuel element was the first of its kind to undergo tests in the high flux hole of the Materials Test Reactor, Idaho Falls, Idaho. In addition, thermal and mechanical shock tests have been conducted by manufacturer in conjunction with metallographic tests to determine the nature and strength of the bond between core and cladding. Static and corrosion tests were performed under temperature and pressure conditions more severe than those encountered at the MTR pile, but otherwise duplicating the MTR. Results in all tests were above expectations.

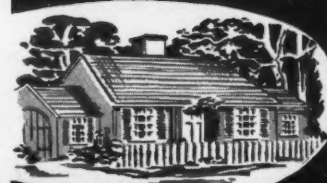
(Tubular fuel element was developed by Nuclear Division, Glenn L. Martin Company, Dept. CP, Baltimore, Md. . . . or for more information check 9376 on form opposite last page.)

Glass-reinforced preforms produced in 30 seconds by process . . .

ribs, bosses, and other protuberances become integral parts of preform in one operation

Low-cost process has been developed which introduces high-speed mass production methods to the manufacture of fibrous glass-reinforced plastic products. Fully automatic and continuous, process produces precision preforms which are in the shape of the finished plastic product, but consist

How To Save Money On OUTSIDE RED HOUSE & BARN PAINT FORMULATIONS



By proper selection of Pure Red Iron Oxide pigments and extenders, pigment-volume ratio can be increased, fading and color losses retarded, and general durability improved.

Exposure tests on our fences as long as 7 years clearly indicate the improvement in performance which can be obtained through revised compositions. You may have reviewed these test panels at the recent Paint Industries Show.

Your Williams representative will be glad to talk with you about house and barn paint formulations. Why not see him?

WILLIAMS

COLORS & PIGMENTS

C. K. WILLIAMS & CO.

Easton, Pa.

East St. Louis, Ill. • Emeryville, Cal.

When inquiring check 9377
opposite last page

CHEMICAL PROCESSING

only of the reinforcing material. Ribs, bosses, and other protuberances become integral parts of the preform in one operation.

Units can be turned out in 30 seconds to 2½ minutes, depending upon design. The precision with which the preform is made permits its entire use in the finished-product mold. "Pinch off" wastes are eliminated. Various proportions of glass to other reinforcements can be used to meet different strength and cost requirements.

Principal significance of process is that it may lead to wider applications of reinforced plastics because of the greater flexibility of product design it permits. It could also lead to further mechanization of plastic molding techniques.

Use of the process for making reusable military shipping and storage containers is already opening up what is expected to become one of the largest markets for reinforced plastics. Other products which may be made by the new process are automobile bodies, luggage, boats, bathtubs, sinks, chair bottoms, machine housings, and other items which need bosses, ribs, or flanges for fastening.

(Pressurform process may be licensed from the Pressurform Company, Dept. CP, 119 West 57th Street, New York 19, New York . . . or for more information check 9378 on form opposite last page.)

How to recruit and select office employees

Based on survey conducted on 320 companies, 175-page book contains useful information about job evaluation, recruitment, and problems and pitfalls in selection of office personnel. Separate section of book is devoted to model forms. These include job descriptions, application blanks, interview rating forms, tests, reference inquiries, performance follow-up forms, and merit rating forms.

To obtain Research Report 27, "Recruiting and Selecting Office Employees" remit \$4.75 direct to American Management Association, Dept. CP, 1515 Broadway, Times Square, New York, 36, New York.

CP is "different" . . .

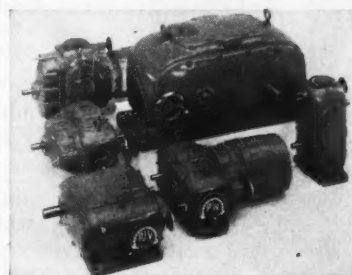
. . . in style—how an article is written. It's tailored for rapid, informative reading by the busy processing man.

. . . see page 171

Because it uses a positive chain rather than frictional elements to transmit power...LINK-BELT P.I.V. delivers

variable speeds with unvarying accuracy

Throughout industry, chain drives have long been preferred as a simple, versatile method of transmitting power positively and accurately. But it was not until the conception of Link-Belt P.I.V. that this advantage was adapted to variable speed drives. With its self-tooth-forming chain principle, P.I.V. provides instant selection of any speed between its maximum and minimum settings without stopping the machine.

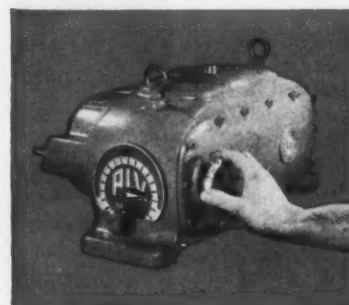


P.I.V. drives are built in capacities from ½ to 25 hp, in 8 sizes and 16 types. Compactness permits installation as a separate unit or built-in part of driven machine.

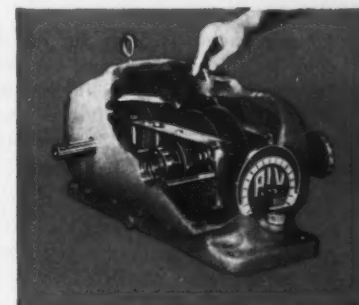
THE exclusive P.I.V. chain consists of a series of overlapping steel slats. These are free to move transversely from side to side, singly or collectively, serving as teeth. The chain meshes with radially grooved wheels, which are cut at a constant depth toward the wheel periphery. Beveled sides of the grooves offer gripping areas . . . provide a positive, non-slip contact at any speed, under all loads.

All-metal construction of P.I.V. is unaffected by atmospheric conditions. Housings are of close-grained gray iron—internal moving parts are automatically splash-lubricated.

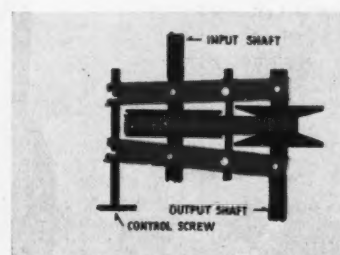
You'll find much interesting and valuable information concerning P.I.V. in Book 2274. Link-Belt also



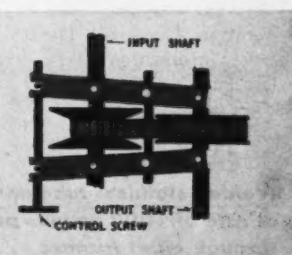
TO CHANGE OUTPUT RPM, operator merely turns convenient handwheel to selected speed, indicated by easy-to-read dial.



AUTOMATIC ADJUSTMENT of chain tension—by turning hand screw—assures accuracy during long life of drive.

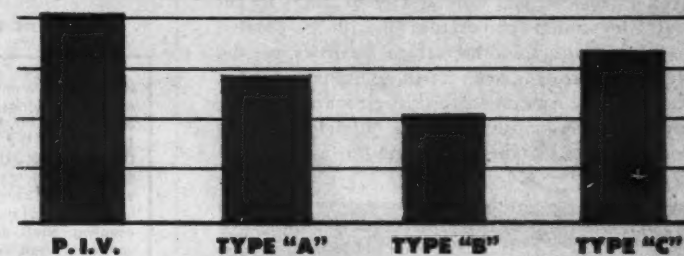


AT MAXIMUM SPEED SETTING . . . chain grips wheel grooves near perimeter of input side and near center of output side.



AT MINIMUM SPEED SETTING . . . relative position of chain to wheels is reversed, delivering low output shaft rpm.

COMPARISON OF ACCURACY WITH P.I.V. AND 3 OTHER VARIABLE SPEED DRIVES



Using P.I.V. as a standard, bars indicate comparative ability to maintain desired rpm from no-load to full-load relative to three conventional variable speed drives. Chain principle of P.I.V. minimizes speed

drop—loss of accuracy which may affect product quality and uniformity. Operating independent of friction, P.I.V. provides instant, positive selection regardless of load or atmospheric conditions.

makes mechanical, hydraulic, electronic and pneumatic controls for regulating these drives automatically, and these are detailed in Book 2349. Ask your Link-Belt office.

LINK-BELT COMPANY: Executive offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office: New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World. 14-194

When inquiring check 9379 opposite last page

Uniformity and colorfastness obtained with new nylon dyeing process . . .

treated product shows high resistance to color loss when washed at 160-220°F

Filament nylon is being successfully dyed in fast color by a newly developed process. Known as the "Chemnyle process", the method uses acid and direct dyestuffs instead of dispersed dyestuffs used up to now on nylon. It is adaptable to all forms of conventional dyeing equipment.

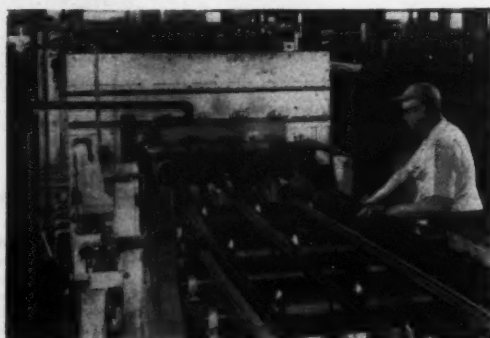
Fabrics dyed by the process show good resistance to color loss when washed at 160 to 212°F. Improvements in lightfastness are also reported. Process gives same excellent uniformity of dyeing normally encountered with dispersed acetate dyestuffs plus added advantage of high fastness properties of acid and direct dyestuffs, particularly when aftertreated with dye assistants.

(Process was developed by The Chemstrand Corporation, Dept. CP, Decatur, Alabama . . . or for more information check 9380 on form opposite last page.)

Welded stainless tube annealed at rate of 1000 pounds per hour through giant furnace . . .

treated product has smooth finish which, for many applications, needs no added processing

Believed to be largest of its kind in the stainless steel tube industry, continuous bright annealing furnace at Republic Steel is capable of processing 1/4 to 4" OD/welded tube at rate of 1000 lb per hr at a maximum temperature of 2100°F. Treated product retains smooth surface qualities of the original flat-rolled steel finish, eliminating need for polishing. Amount of pickling required is less. Furnace proper consists of four high-temperature alloy-steel muffle tubes extending through a gas-



Furnace proper has four high-temperature alloy-steel muffle tubes extending through a gas-fired furnace and connecting with tubular water-cooled chambers



To trouble-free pressure vessel mixing

Philadelphia "packaged" Mixers are designed for maximum adaptability to all fluid agitation applications. Standardization, high-production and complete control of all manufacturing by Phillie Gear assures you outstanding mixer performance at minimum cost.

Check these unmatched features:

1 Mechanical seal readily accessible . . . just loosen coupling bolts . . . entire shaft and impeller assembly is then independently supported . . . no lifting equipment required for replacement of seals.

2 Lower shaft bearing placed close to seal for minimum runout . . . separated sufficiently to prevent interleakage of lubricants.

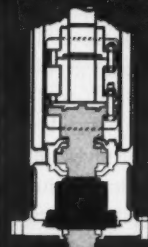
3 In-tank coupling optional . . . provided if desired for easier unit installation . . . not necessary where process conditions limit its use.

4 Seal will operate for years without maintenance . . . is designed for quick replacement as a single unit . . . retention of factory-established shaft alignment is assured.

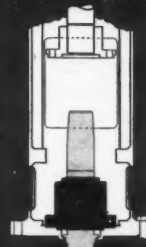
For complete information, please request Bulletin A-256.

One man and a wrench can remove and replace this new Unitary shaft seal in minutes.

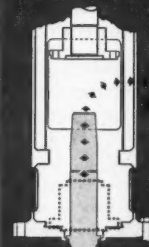
(1) Loosen lock ring at top of seal. MIXER SHAFT IS NOW FREE TO MOVE UP OR DOWN THROUGH SEAL. Next, loosen extra long bolts in lower flange of spacer coupling. Shaft drops until collar rests in cup on mixer base flange. The entire weight of lower shaft and impellers is supported by this assembly.



(2) Remove bolts and pull out spacer, thrust plate and half coupling from top of mixer shaft. Unbolt and remove top of lower bearing housing. Loosen bearing lock nut, remove bearing components and lower half of housing. Note that absolutely no lifting equipment is needed.



Remove mechanical seal assembly by simply sliding it up mixer shaft and out through opening in reducer support stand. Replace with a spare seal assembly and ship the old seal to us for maintenance.



philadelphia mixers

PHILADELPHIA GEAR WORKS, INC.

ERIE AVE. & G STREET, PHILADELPHIA 34, PENNA.

Offices in all Principal Cities

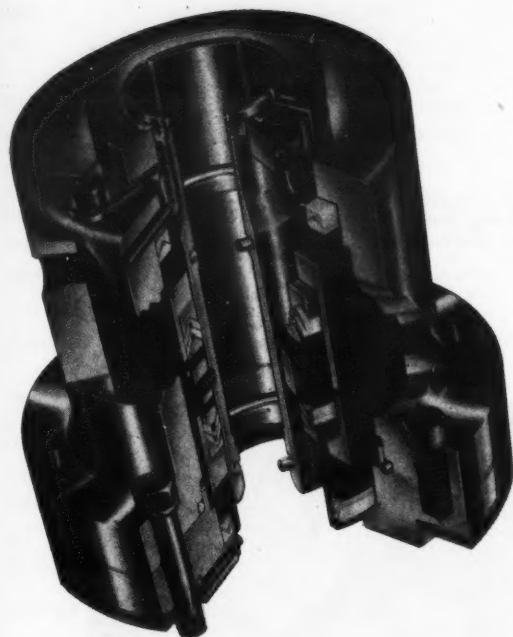
INDUSTRIAL GEARS & SPEED REDUCERS • LIMITORQUE VALVE CONTROLS • FLUID MIXERS • FLEXIBLE COUPLINGS
Virginia Gear & Machine Corp. • Lynchburg, Va.

When inquiring check 9381 opposite last page

CHEMICAL PROCESSING

Here's the Seal...

that makes Philadelphia Mixers so trouble-free



For further information on this particular mechanical seal, contact Philadelphia Gear Works. For your other mechanical seal problems call your Garlock representative at any of Garlock's 30 sales offices and warehouses throughout the U.S. and Canada.

Engineers at Philadelphia Gear Works asked Garlock to design a seal that would operate for years without replacement . . . a seal that would make it possible to run *any* chemical, pharmaceutical, or food processing operation under pressure without contamination.

These specifications called for a precision-made mechanical seal which could outperform even the best designed stuffing box.

Here is the seal Garlock designed for Phillie Gear:

1. The "Philadelphia-Garlock" Seal is completely self-contained. Factory pre-set . . . no on-the-job adjustments needed. Just slip over agitator shaft, bolt to mounting flange and tighten lock ring to shaft . . . makes both installation and replacement easier than with *any other design*.

2. Standard Seal Assemblies, available from stock, are constructed with all metal components in contact with process liquids made of type 316 stainless steel, all resilient members of Teflon. It is the most versatile *standard* seal available. It can be used with acids, alkalis, most solvents, and under practically all process conditions. The standard seal is rated for temperatures up to 450° F., pressures to 200 p.s.i.g.; other seals available for pressures to 1000 p.s.i.g.

THE GARLOCK PACKING COMPANY, Palmyra, New York

GARLOCK



Packings, Gaskets, Oil Seals, Mechanical Seals,
Rubber Expansion Joints

When inquiring check 9382 opposite last page

DECEMBER 1956

IDEAS

fired furnace and connecting with tubular, water-cooled chambers. Alloy wire-mesh chain belts extending through the tubes carry the work through heating and cooling chambers which cover a section 78' long. Conveyors leading to and from furnace can be adjusted so that tube moves through unit at rates of one to six fpm.

One of the most important quality advantages of the process is the assurance of a scale-free inside diameter, especially on long-length small-diameter tubes which are difficult to pickle clean when annealed in conventional open furnaces. In addition to being time-consuming and expensive, pickling results in loss of metal. Standard pickling practices also leave an open frosted surface which readily scratches and picks up contamination and discoloration. Bright annealed tube has a smooth finish which, for many applications, requires no further processing.

(Bright annealed stainless steel tube is product of Steel & Tubes Division, Republic Steel Corporation, Dept. CP, Cleveland, Ohio . . . or for more information about manufacturer's product, reader may simply check 9383 on the convenient Reader Service slip which is located opposite last page.)



*"Just because a man is on straight
daylights you can't call him shift-
less!"*

Idea by F. L. Rice, Jr., Borger Fractionator Process
Group, Phillips Petroleum Co., Phillips, Texas.

Growing diversity of chemical products and increased emphasis on product purity mean more problems in protecting carrier equipment. At Metalweld . . .

SPRAY GUN AND THICKNESS GAGE AID TANK CAR LINING



Close to 10% of tank cars presently in use, or more than 17,000, have interior protective coatings or linings. Because of the ever-increasing diversification of chemical products, and rising use of tank cars, protection of tank car interiors and exteriors is continuing to rise at a rapid rate to meet customer demand for high standards of product purity and protection of expensive carrier equipment.

There are four basic systems of interior protection available to industry: 1) sheet linings, 2) sprayed metal; 3) liquid synthetic coatings,

and 4) a combination of sprayed metal and synthetic coatings. All four require careful attention to selection for a given service, surface preparation, application, curing, and scientific testing of finished job.

At Protective Coatings Div., Metalweld, Inc., Philadelphia, Pa., choice and application of a lining proceeds as follows: A discussion is held to consider 1) particular problem of carrier corrosion and product contamination; 2) protective linings and coatings available, their differences and similarities; 3) proper

◀ Blasting surface with abrasive is a vital step in preparing for tank car lining. Process cleans surface and gives proper etch for lining adhesion

Spraying is done with gun that provides uniform thickness on all surfaces. Unit is easily disassembled for cleaning and parts changing



Final thickness and uniformity of coating is checked with instrument, gives reading directly without conversions

A wide selection of linings and combinations of linings are available. A few of these, and applications for which they are used, are listed below.

SPRAY LININGS

| Material | Used for |
|-----------------|---|
| zinc | water-white liquids: glycerine, glycols, gasoline, and acetone; flake polystyrene, and flake and powdered cellulose acetate |
| aluminum | phthalic anhydride, transparent lacquers, detergents |
| stainless steel | ethylene oxide |
| tin | ethylene diamine |
| neoprene latex | high caustic resistance |
| vinyl | where contamination, particularly of food or beverages, is a considered factor |
| phenolics | resistance to organic solvents and acids |
| liquid neoprene | resistance to concentrated acid fumes, fats, and oils |

SHEET LININGS

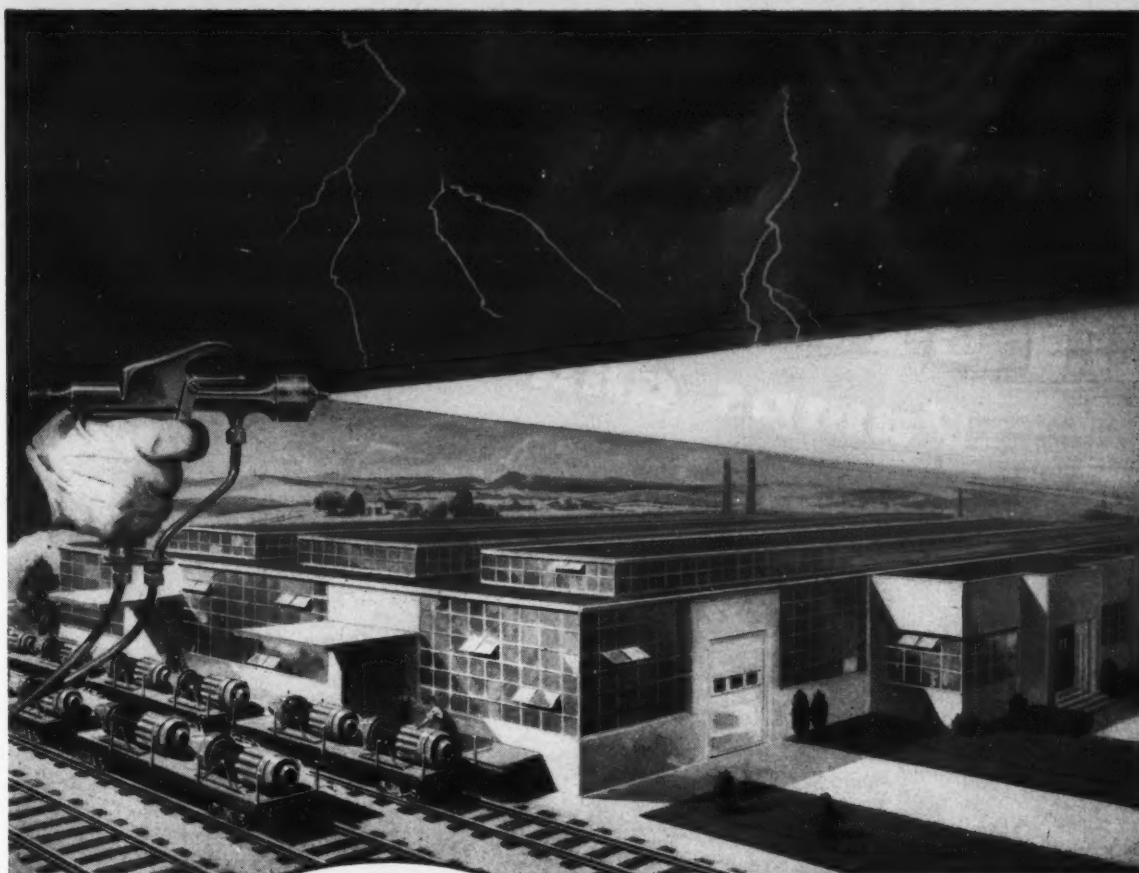
| Material | Used for |
|--------------------|--|
| natural rubber | inorganic acids, salts, and alkalis |
| neoprene | oxidizing agents, common inorganic acids and alkalis |
| polyvinyl chloride | strong oxidizers |

Other spray coatings used for specific application are: catalyzed phenolics, asphalt bitumens, completely inorganic liquid zinc, coal tar bitumens, chlorinated rubber, furanes, and Thiokol. In some cases a combination of sprayed metal impregnated and coated over with an organic can be used to resist higher temperatures, pinholing to base metal, blistering of organic coating, and underfilm corrosion.

preparation of tank car; 4) proper application. Both past history and future service of car must be considered because former linings or previously carried products can sometimes become origins of corrosion or contamination, or interfere with bond of contemplated lining.

Surface preparation is critical. All areas to be lined must be as smooth as possible and free of all foreign substances such as grease, rust, or scale. A blasting abrasive is used to clean metal and to effect an etch to a depth determined by type of lining to be applied.

(Please turn to next page)



Spray on **PROTECTION** ... and wipe out the threat of wear and weather with 6 Exon solution resins

To wipe out corrosion by weather, rust and rot, industry looks to the performance and versatility of the 6 specifically-engineered Firestone Exon solution resins.

Formulated into compounds that can easily be sprayed, brushed, rolled or dipped, these 6 resins cover a variety of needs so diverse that virtually every coating purpose and function is served ... effectively.

Each of the 6 Exon solution resins is engineered for a specific type of application. It may protect a product, a part, a roomful

of machinery or the outside of a plant. Some feature so powerful an adhesive grip that they hold fast for many damage-free years. Others are made to peel off clean in seconds.

All are tough, economical vinyl resins that can help save billions of dollars that management once passed off as "necessary depreciation" due to corrosion. They are a few of the many resins in Firestone's complete line of versatile vinyls. Another reason why industry looks to Exon for engineered answers to its needs.

because

they're made
of

Firestone



Firestone Plastics Co. supplies only the resins, does not make the finished solutions.

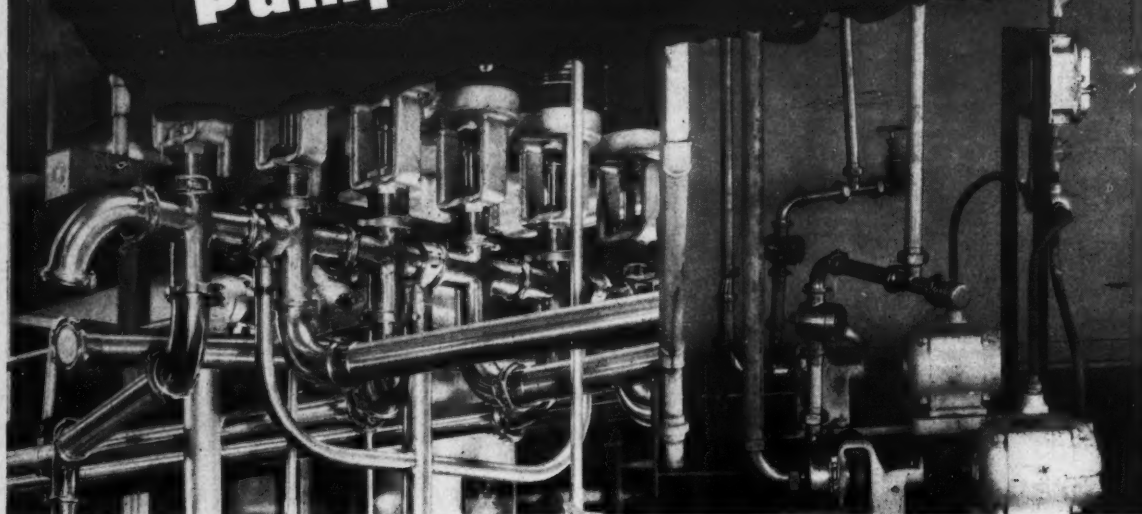
VERSATILE VINYL RESINS
engineered answers to industry's needs

For complete information or technical service on the entire line of Exon resins, call or write today:
CHEMICAL SALES DIVISION

FIRESTONE PLASTICS CO., DEPT. 788, POTTSVILLE, PA. • A DIVISION OF THE FIRESTONE TIRE & RUBBER CO.

When inquiring check 9384 opposite last page

Solve Corrosion Problems and Protect Product Quality ... with **TRI-CLOVER** Pumps and Fittings



Battery of electrically-operated Tri-Clover compression valves with Tri-Clamp connections in a liquid conveying line.

A large midwestern processing plant employs these Tri-Clover centrifugal pumps and Tri-Clamp valves and fittings for handling corrosive liquids.

Reduce Corrosion! Protect Product Quality!

These are vital considerations when selecting pumps and fittings for chemical process service. Tri-Clover Division's constant research has developed exclusive design features that combine a high degree of corrosion-resistance with ease of assembly and disassembly . . . thus facilitating cleaning as well as allowing fast and economical changes in piping arrangements.

For pumping applications, Tri-Clover has a full line of centrifugal pumps designed to handle any product that will flow to them. A wide choice of

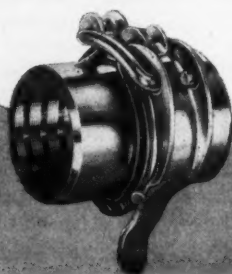
seals are available, including inert carbon rotary seals for sanitary applications, packing gland seals, water cooled seals and seals for latex handling.

Tri-Clover stainless steel fittings of the sanitary type, with polished inside and outside surfaces, offer protection against corrosion and product contamination. They are available in threaded types or in the new Tri-Clamp design—no welding is required.

Let our engineering staff help you solve your liquid conveying problems. Write for descriptive literature.

The sanitary type Tri-Clamp union with snap-action spring clamp and toggle locking device is shown at the right.

Available also with bolt type locking device in Schedule 5 pipe and Tube O.D. sizes in stainless with white pickle finish. Write for information.



LADISH CO.
Tri-Clover Division
Kenosha Wisconsin

See your
nearest
Tri-Clover
Distributor.

TRI-CLOVER

Export Dept.
8 S. Michigan Ave.
Chicago, U.S.A.
Cable TRICLO

4-254

When inquiring check 9385 opposite last page

CORROSION CONTROL

Tank Car Lining

(Continued from preceding page)

In application of lining first coat is brushed rather than sprayed to work microscopic dust particles into coating where they are harmless. Spraying would freeze these particles between metal and lining where they could conceivably interfere with the bond.

Spraying of synthetic resin linings is done with a model P-MBC-514 spray gun. Fitted with a properly selected air cap and fluid nozzle, this gun provides excellent spray characteristics to assure an even, uniform coating. Unit can be easily disassembled for cleaning and parts changing. Clean dry air, volume air filters, proper hosing, and adequate pressure must be provided. Too-close spraying may cause runs. Too-distant spraying, or arcing of gun, will produce overspray. Corners need meticulous care.

Thickness testing on all synthetic resin film applications, as well as zinc and aluminum metal sprays and combination coatings, is accomplished with a model 600 Coatingage. Proper thickness of coating is imperative. Rivets and overlapping plates, and all changes in direction of tank car structure, must be coated uniformly so that no thin spots are present.

Instrument measures thickness of non-magnetic coatings on magnetic base materials such as iron or steel, by indicating unbalance of a magnetic circuit. Unbalance is caused by changes in impedance of gage coil at different distances from base material. Distance is controlled by, and equal to, thickness of coating. Change is reflected in reading on calibrated scale of microammeter. Thicknesses can be read directly without conversions. Because instrument is battery operated, it needs no warmup period and can be easily moved in and around complicated structures.

Care and precision in surface preparation, lining application, and testing of finished job will assure the customer of years of service in safeguarding product purity and also in protecting the carrier against corrosion.

(Tank car lining is performed by Protective Coatings Div., Metalweld, Inc., Dept. CP, Scotts Lane & Abbotsford Ave., Philadelphia 29, Pa. . . . or for more information reader may simply check 9386 on the Reader Service slip which is located opposite last page.)

(Spray Gun used for coatings is a product of The DeVilbiss Co., Dept. CP, Toledo 1, Ohio . . . or for more information reader may simply check 9387 on form opposite last page.)

(Coatingage was supplied by Branson Instruments, Inc., Dept. CP, 37 Brown House Rd., Stamford, Conn. . . . or for more information reader may simply check 9388 on the Reader Service slip which is located opposite last page.)

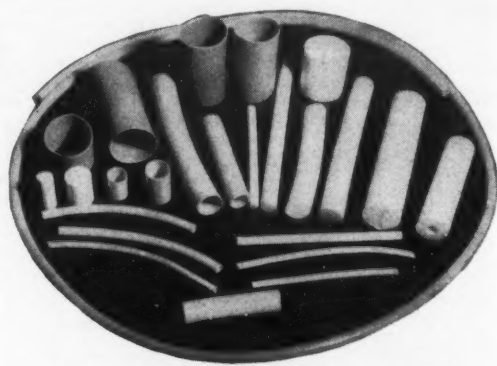
CORROSION CONTROL

Teflon tubing, Teflon-lined pipe available for severe applications . . .

withstand nitric, hydrochloric, sulfuric, hydrofluoric, hydrobromic acids

Uses: For corrosive applications.

Features: Teflon resists nitric, hydrochloric, sulfuric, and hydrobromic acids. It is unaffected by highly oxidizing compounds and many other severe corrosives. Corrosion resistance of Teflon plus the strength of steel is obtained with Teflon-lined pipe.



Samples of pipe, tubing, and rods made of Teflon

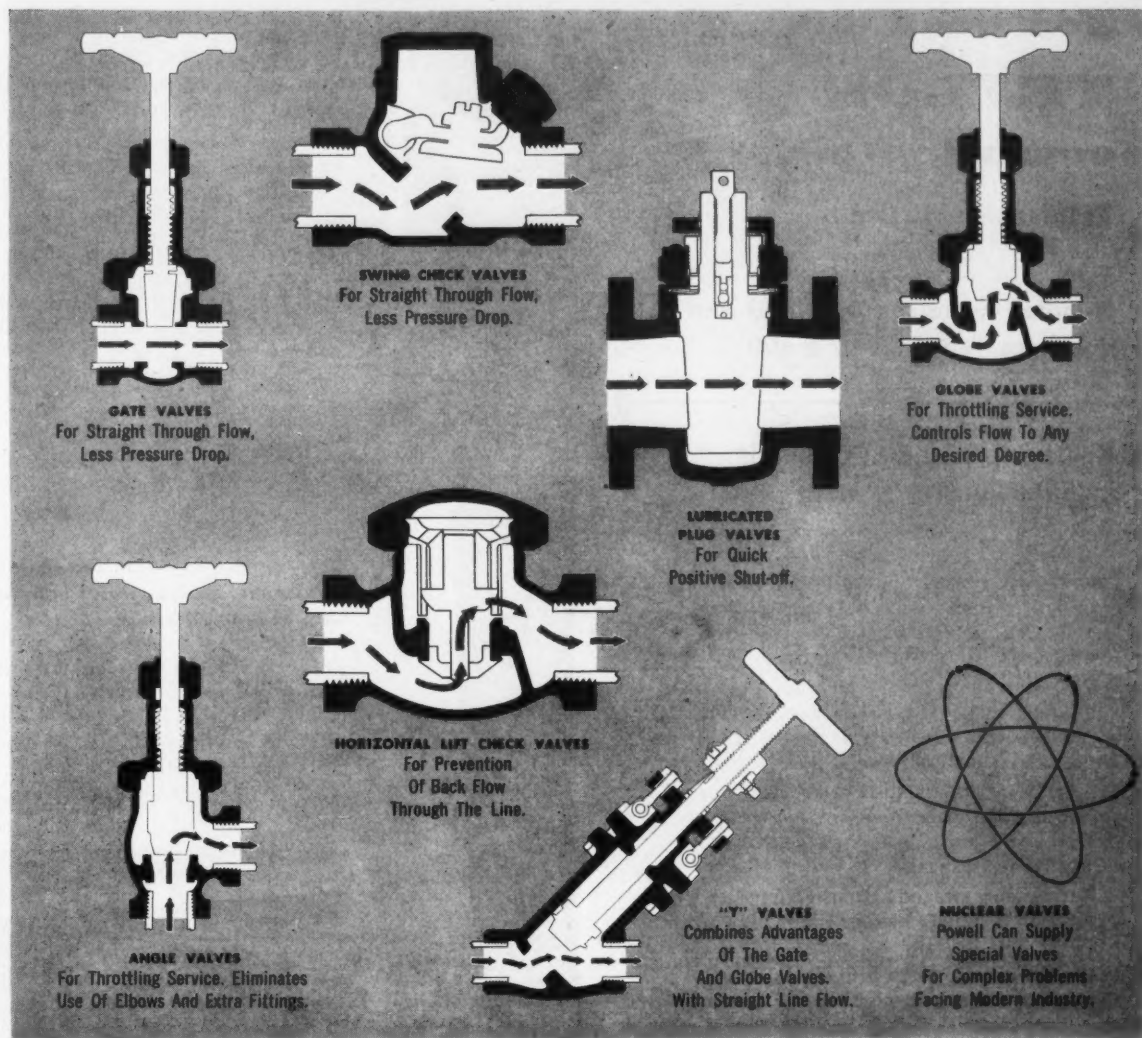
Description: Pipe, tubing, and rods of Teflon and Teflon-lined steel pipe being manufactured can be cut to desired lengths in field and readily flanged. Variety of sizes are available.

(Teflon tubing and Teflon-lined pipe are products of Havg Industries, Inc., Dept. CP, 900 Greenbank Rd., Wilmington 8, Del. . . or for more information check 9389 on form opp. last page.)



"Smith, from now on use the ice box to cool your pop!"

POWELL for all valve needs



for every flow control problem there is a right Valve

Powell can supply this right valve—made right of the right material. Every part of every valve must pass rigid inspection. And as a final step in manufacture, every Powell Valve has *Performance Verified* through an actual line test.

As an aid in selecting the right valve, the basic valve designs are illustrated

here. For complete information on the wide range of sizes and materials available in each type of the basic valves illustrated above, consult your Powell Valve distributor. If none is located near you—or if you have a special flow control problem—write direct to The Wm. Powell Company, Cincinnati 22, Ohio.

The Wm. Powell Company, Cincinnati 22, Ohio . . . 110th YEAR

POWELL VALVES

*BRONZE, IRON, STEEL AND CORROSION RESISTANT VALVES.



When inquiring check 9390 opposite last page

HOSE PROBLEMS?

**You need this
TEFLON®
corrosion-proof
hose**

- Handles virtually every fluid and gas from -100°F to +500°F
- Ageless — and stays flexible indefinitely

SOLVE your really tough jobs for flexible hose with *Fluoroflex-T* hose assemblies — the original Teflon hose now proved by over 3 years of demanding service.

With tube made from a patented, special compound of Teflon, the hose is completely inert to the most corrosive chemicals, active oils and fuels, gases, steam.

SAE 304 stainless steel braid reinforces for up to 1000 psi service (higher in some cases) and maintains this strength by its corrosion resistance.

Permanent, swaged fittings give positive protection against leakage and blowoff.

These lightweight, space-saving hose assemblies solve tough problems, increase reliability, cut replacement costs. Made by the originator of Teflon hose — the one company that makes its own Teflon tubing as well as the hose assemblies. For more data, write RESISTOFLEX CORPORATION, Roseland, N. J.; Western Plant: Burbank, Calif.

©Teflon: DuPont trademark.

Fluoroflex: Resistoflex trademark.

RESISTOFLEX

When inquiring check 9391 opposite last page



CORROSION CONTROL

Removes scale and oxide from iron and steel . . .

since no acids are required, corrosion from chemicals is eliminated

Uses: For the electrolytic removal of scale and oxides from iron and steel.

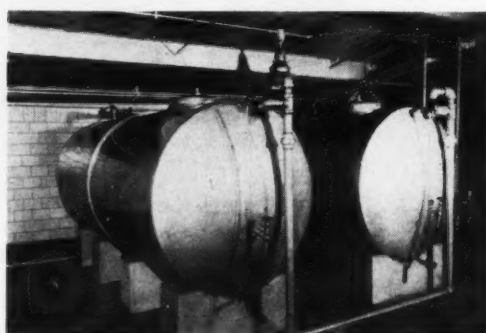
Features: Product removes scale quickly without chemical attack. No acids are required and, therefore, equipment corrosion from acid fumes is completely eliminated.

Description: Descaling compound is a white alkaline material used in water solution with sodium cyanide for the removal of black oxide or scale from iron and steel. It will also remove red oxides.

(Alka-Deox 109 is a product of Enthone Inc., Dept. CP, 442 Elm Street, New Haven, Conn. Check 9392 on form opposite last page.)

Distilled water, deionized water, condensate satisfactorily handled with aluminum alloys

In a recent technical paper information is given on how aluminum alloys are being used to advantage for maintaining distilled or deionized water at a high degree of purity. When extensive alterations were recently made to one wing of a research laboratory, opportunity was afforded to ex-



Typical all-aluminum installation for pharmaceutical plant requiring large quantities of distilled water. Storage tanks (2000 gal) are of 3003 alloy, distribution system of 3003 alloy pipe, fittings of cast B214 alloy, and valves of cast 43 alloy

amine aluminum alloy piping and fittings in the distilled water system after 17 years of service. The 1100 alloy piping and cast 43 alloy fittings and valves were found to be in such excellent condition that all of this material was reused in the new installation.

Many requirements for pure water are now being

Don't rule out RUBBER!

KEL-F® Fluorocarbon Elastomers are doing jobs that rubber never did before

Rubber is perhaps the most useful and versatile non-metallic material used by industry today. Its resilience and resistance to abrasion and breakdown make it an important tool in industrial techniques and plant equipment.

Yet in many applications — where the mechanical properties of rubber are vitally needed — extremely high-temperature and corrosive operating conditions have ruled out its use.

The development of KEL-F Fluorocarbon Elastomer fills a long felt need. Here is a high strength rubber that can operate effectively under corrosive and high temperature conditions that swell, stretch and melt ordinary rubber and common organic elastomers.



Today, KEL-F Elastomer can be considered for those jobs once thought "impossible" for rubber. A glance at the outstanding properties of KEL-F Elastomer discloses the reason for its remarkable success:

- Extreme resistance to acids, ozone, and other oxidants.
- Thermal stability to 400°F.
- High resistance to solvents, fuels and lubricants.
- Good dielectric properties.
- Low moisture absorption.
- Non-flammability.

KEL-F Elastomers have convincingly demonstrated their value in a variety of industrial roles: As *sealants* for corrosive liquids, abrasion and corrosion resistance *pump impellers*... heat and chemical resistant *hose, tubing, diaphragms, gaskets* . . . *transmission, brake and aircraft seals* . . . corrosion and flame resistant *protective clothing* . . . electrical and shock *insulation*.

A PRODUCT OF FLUOROCARBON RESEARCH

This new elastomer is a result of Kellogg's comprehensive research in fluorocarbon chemistry. Its performance characteristics are well established in the chemical, electrical and equipment fields. If your work involves rubber at any point, then KEL-F elastomer warrants investigation.

Our Technical Staff is prepared to work with you in adapting KEL-F Elastomer to your individual needs. For further information, write: The M. W. Kellogg Company, Subsidiary of Pullman Incorporated, Chemical Manufacturing Division, P. O. Box 469, Jersey City 3, N. J.



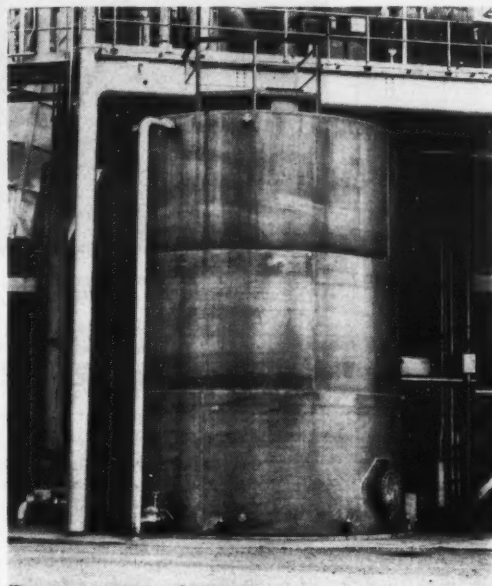
THE M. W. KELLOGG COMPANY
Subsidiary of Pullman Incorporated

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When inquiring check 9393 opposite last page

CHEMICAL PROCESSING

met by the deionizing process rather than distillation. Aluminum alloys have also become standard materials of construction for handling deionized water. Before an aluminum storage and distribution system is placed in operation, it is desirable to condition the system to build up an insoluble and protective film of hydrated aluminum oxide.



One of three aluminum condensate storage tanks (18' diam x 30' high) in service at Alcoa's Rockdale Smelting Works. Carbon dioxide or oxygen in condensate does not harm aluminum

Another application in which aluminum alloys have been found to be particularly well suited is for handling steam condensate containing carbon dioxide or oxygen. These contaminants have no adverse effect on aluminum.

Ability of aluminum alloys to handle high-purity water without contamination has made them of considerable value in atomic energy applications. Other factors favoring this use are good nuclear properties, resistance to corrosion, good heat transfer, formability, ease of welding, resistance to radiation damage, and tensile strength and creep resistance at elevated temperatures.

(Condensed from technical paper, "Aluminum Alloys for Handling High-purity Water," by W. W. Binger and C. M. Marstiller, Aluminum Research Laboratories, New Kensington, Pa. Paper was presented at the 1956 Annual Meeting of the National Association of Corrosion Engineers in New York City.)

(For further information on aluminum alloys for handling high-purity water contact Aluminum Company of America, Dept. CP, Alcoa Bldg., Pittsburgh 19, Pa. Check 9394 opposite last page.)

New TARSET Licks Tough Chemical Corrosion Problems—Economically!



For the economical control of corrosion in tough spots like the acid bath shown above, new Pitt Chem Tarset has no competition! No other protective coating on the market today offers you the broad corrosion-resisting properties and relative low cost of this unique coal tar-epoxy resin coating.

Tarset offers unusual resistance to most acids, alkalis and salts. It is especially recommended for the protection of storage tanks, precipitator tanks, bulk material conveyors and similar equipment where corrosive conditions are severe.

Tarset does not shatter or loosen when subject to extreme impact tests. And it actually becomes harder at elevated temperatures! It can be applied by spray, brush, or roller.

What can Tarset do for you? If you have a stubborn corrosion problem that must be solved within a definite maintenance budget, Pitt Chem Tarset may be your answer. We'll be glad to send you complete technical data and samples for testing.



Send for Descriptive Booklet on TARSET today

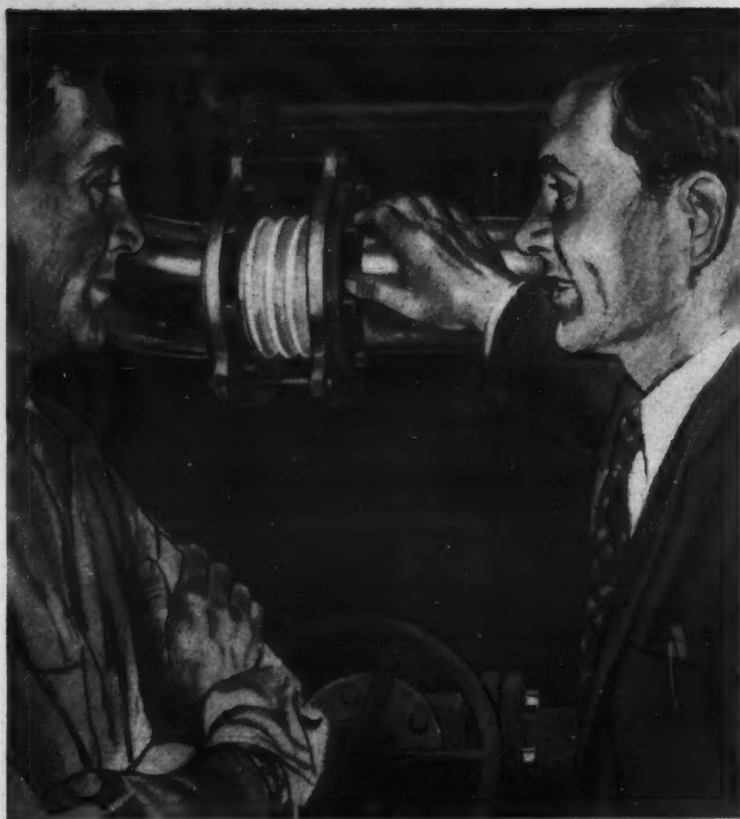
Free booklet tells how to use amazing new Tarset to reduce costly corrosion. Gives detailed description of Tarset's specifications, properties and application characteristics. Write for your copy today!



WSW 6177

COAL CHEMICALS • PROTECTIVE COATINGS • PLASTICIZERS • ACTIVATED CARBON • COKE • CEMENT • PIG IRON

When inquiring check 9395 opposite last page



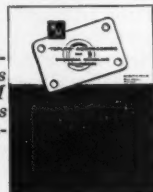
PROTECT YOUR COSTLY PIPING AND EQUIPMENT WITH R/M "TEFLON"*

You can buy no finer protection for your equipment investment. R/M Expansion Joints and Flexible Couplings have a unique convolution design incorporating adequate wall strength at all critical points. This enables them to absorb greater shock and vibration. These connections also have limit bolts which prevent over-extension. "Teflon" is used in all cases because it is impervious to

any known industrial acids and caustics; has no known solvent; has zero water absorption; and is unaffected by weather.

*Du Pont trademark

For complete information, send for this booklet on R/M "Teflon" Accessories for Chemical Handling Equipment.



R/M MAKES A COMPLETE LINE OF MECHANICAL PACKINGS—including Vee-Flex, Vee-Square, Universal Plastic, and "versi-pak"®; GASKET MATERIALS; "TEFLON" PRODUCTS. SEE YOUR R/M DISTRIBUTOR

R/M

PACKINGS
RAYBESTOS-MANHATTAN, INC.
PACKING DIVISION, PASSAIC, N.J.
MECHANICAL PACKINGS AND GASKET MATERIALS

FACTORIES: Bridgeport, Conn.; Manheim, Pa.; No. Charleston, S.C.; Passaic, N.J.; Neenah, Wis.; Crawfordsville, Ind.; Peterborough, Ontario, Canada

RAYBESTOS-MANHATTAN, INC., Packings • Asbestos Textiles • Industrial Rubber, Engineered Plastic, and Sintered Metal Products • Abrasive and Diamond Wheels • Rubber Covered Equipment • Brake Linings • Brake Blocks • Clutch Facings • Laundry Pads and Covers • Bowling Balls

When inquiring check 9396 opposite last page

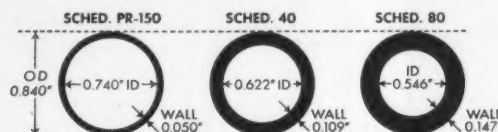
CORROSION CONTROL

Light-wall polyvinyl chloride pipe compares favorably in cost with metal pipe . . .

has uniform pressure rating in all sizes, excellent corrosion resistance

Uses: Pipe can be used to advantage in all of the chemical processing industries.

Features: Light wall polyvinyl chloride pipe recently made available compares favorably on an installed cost basis with conventional threaded piping systems in iron or galvanized.



All schedules 1/2" pipe size

Three end views of 1/2" PVC pipe show comparative wall thickness and flow capacity of light wall and heavier wall pipes

Description: Light-wall polyvinyl chloride pipe recently made available has uniform pressure rating in all sizes. This series, known as Schedule PR-150, represents an addition to company's recently announced Schedule 40 and 80 pipe. Its generally thinner wall and larger inside diameter give it greater flow capacity than Schedule 40 and 80 in the same nominal pipe sizes.

There are two basic types in the new series. One has high chemical resistance and a maximum working pressure of 150 psi at 75°F. The other has high impact strength and a rating of 125 psi at the same temperature. Full line of solvent cement fittings is available for use with the PVC pipe.

(PVC pipe is product of Alloy Tube Division, The Carpenter Steel Company, Dept. CP, Union, N.J. . . . or for more information reader may simply check 9397 on the Reader Service slip which is located opposite last page.)

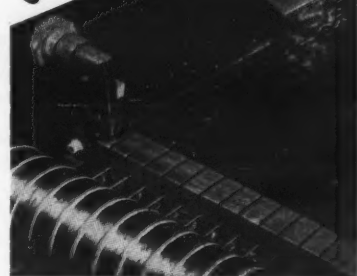
Why is this magazine so "different" in . . .

- type of articles?
- how they're written?
- how they're presented?

Look for the answers on page 171

Molded Hard Rubber proves best for . . .

Temperature and Corrosion Resistance



ANOTHER CORROSION PROBLEM SOLVED BY LUZERNE

Above is shown a portion of a typical cell in Western Electric Company's Electroforming plant at their Point Breeze Works. This cell consists of a plastic lined metal shell with hard rubber weir plates fastened to each end. The feed weir shown is cored and connected to the electrolyte supply line by a flexible elbow.

Western Electric reports that a number of materials were considered for fabrication of these weirs and flexible elbows and it was concluded that hard rubber and neoprene provided the best combination of temperature stability, corrosion resistance, mechanical strength, ease of fabrication, and moderate cost.

Luzerne fabricates these hard rubber parts for Western Electric: — Luzerne can solve your corrosion problem too. Write for information on Hard Rubber Molded Products, or send your problem for analysis by our engineering department.



The LUZERNE RUBBER CO.
200 Muirhead Avenue Trenton, N. J.

Sales Representatives
ALBERT J. COX CO.
Chicago, Ill.

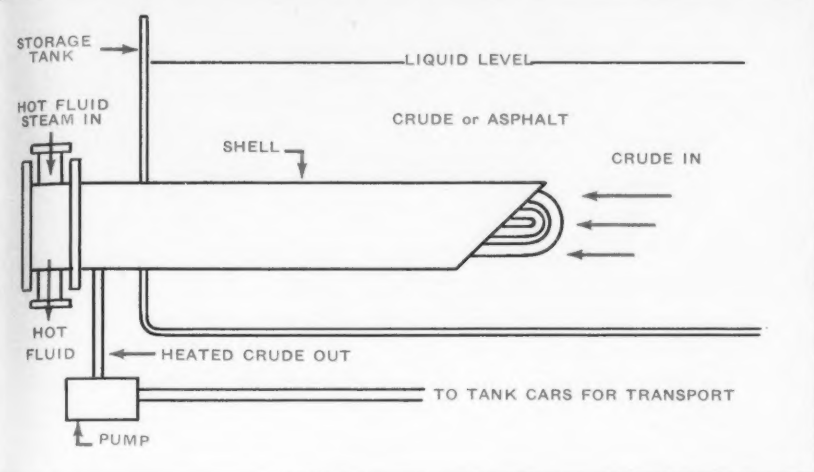
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Los Angeles, Calif.

When inquiring check 9398 opposite last page

CHEMICAL PROCESSING

TEXANS SHOW HOW TO HURRY CRUDE FROM STORAGE



TRUFIN TYPE S/T IS WIDELY USED

Day by day throughout the entire heat transfer field, Wolverine Trufin Type S/T is being used in an increasingly large number of applications. Typical of the uses to which engineers are putting this capacity-boosting and cost-cutting integral finned tube, are:

condensing freon and other refrigerants, condensing hydrocarbons, condensing organic chemicals, evaporating freon-water chillers, boiling hydrocarbons, heating or cooling gases, heating or cooling lube oils, transformer oils, absorber oils and quench oils.

Type S/T can be specified in any of a wide range of sizes and alloys in copper, aluminum or electric-welded steel. It is available with either 16 or 29 fins per inch. Because its integral fins give added support on bends, Trufin Type S/T can be fabricated just as readily as plain tube.

GOT A PROBLEM? JUST ASK F.E.S.

Among the many services Wolverine maintains for the convenience of its customers is the staff of highly trained tubing technicians in its Field Engineering Service.

These men, in addition to their individual training and knowledge, can

draw on Wolverine's background of tubing experience to help solve customers' problems in design, corrosion, fabrication, etc. The staff is available at all times and their services impose no obligation.

SEND FOR FREE BOOK!

One of the most comprehensive sources of information available on finned tube is Wolverine's Trufin Opportunity Book. In addition to much background data, this book contains valuable information on designing with integral finned tube. There are a number of actual Trufin case histories describing performance boosts and cost reductions made possible by Trufin Type S/T. There is no charge for this book. Write for your copy—today.



INTERCHANGEABILITY

Complete interchangeability with prime surface tube is an important feature of Wolverine Trufin Type S/T. When retubing with Type S/T, only standard tools and tubing techniques are required. There is no deviation from normal procedure.

CALUMET & HECLA, INC.

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WOLVERINE TUBE DIVISION
FOREST INDUSTRIES DIVISION
GOODMAN LUMBER COMPANY
CALUMET & HECLA
OF CANADA LIMITED
CANADA VULCANIZER AND
EQUIPMENT COMPANY LIMITED



WOLVERINE TUBE

Division of Calumet & Hecla, Inc.

1469 Central Avenue, Detroit 9, Michigan

Manufacturers of Quality-Controlled Tubing and Extruded Aluminum Shapes

FINNED U-BEND TUBES SPEED WORK, CUT COSTS

by Ernest Dodd

Down Texas way, engineers are using a highly efficient and economical method for putting a little hustle into crude as it is moved from storage tanks at ambient temperatures.

Instead of tank suction heaters using prime surface tube, the Texans designed new heaters around Wolverine Trufin® Type S/T, finned tube of electric-welded steel, in U-bend form. The results—from the standpoint of both performance and economy—have been most satisfactory.

For example, because its integral fins give Trufin more than twice the effective heat transfer surface of plain tube, it was possible to design smaller heaters using fewer tubes. The result was a substantial saving in direct tube costs.

Despite their smaller size, the new units—with super-heated steam on the tube side—heat the crude from normal temperatures to 250°-300° F. This allows large quantities of the highly viscous crude to be withdrawn from the tank at a greatly increased rate of flow. The design used is a simple, single shell side pass over the U-bend tubes.

In addition to outstanding performance and the direct savings made in tube alone, the use of Wolverine U-bend tubes also contributed further savings in labor and material.

U-bend tubes were prefabricated by Wolverine to exchanger prints and packaged in expendable pallets in the exact order of their installation. On receipt of shipment it was only necessary for the equipment manufacturer to feed them directly from the pallet into the unit. Their use also resulted in the elimination of one tube sheet, a reduction by half of rolling-in operations and the elimination of floating head problems.

The CONDENSER TUBE *for* REBOILERS



Although the condenser tubes they now use are still made of low carbon electric-welded steel, engineers at a large refinery have discovered that the addition of integral fins can work miracles in reboiler operations.

Simply by changing from plain tube to Wolverine Trufin Type S/T U-bend condenser tubes, the engineers stepped up reboiler capacity and greatly reduced the cleaning frequency. In addition, the use of U-bend tubes also eliminated the cost and maintenance of the floating head.

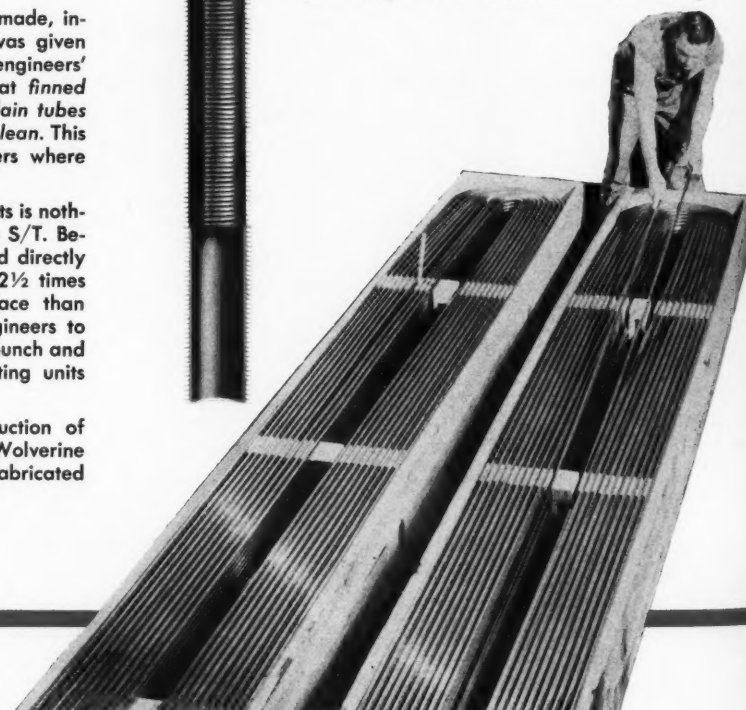
However, before the change was made, integrally finned Trufin Type S/T was given extensive laboratory tests. To the engineers' amazement these tests proved that *finned tubes do not foul as readily as plain tubes and, that once dirty, are easier to clean.* This is of major importance in reboilers where shell side fouling is great.

Boosting capacity and reducing costs is nothing new for Wolverine Trufin Type S/T. Because its integral fins are squeezed directly from the tube wall, Type S/T has $2\frac{1}{2}$ times more effective heat transfer surface than does plain tube. This enables engineers to design smaller units with a bigger punch and to skyrocket the capacity of existing units when retubing.

In addition to its exclusive production of integrally finned condenser tube, Wolverine is also a direct mill source for prefabricated U-bend tubes.

Wolverine ships U-bends to the user in expendable pallets. They are removed in the exact order of their installation — reducing unit fabrication time, eliminating one tube sheet and cutting rolling-in operations by half.

If your plant operates reboilers, Wolverine Trufin Type S/T U-bend condenser tubes can help you increase capacity and reduce costs. Specify them for new equipment or when retubing. For complete information write for your copy of the Wolverine Trufin Catalog.



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1469 Central Avenue, Detroit 9, Michigan

Manufacturers of Quality-Controlled Tubing and Extruded Aluminum Shapes

Wolverine Trufin available in Canada through the Unifin Tube Company, London, Ontario

PLANTS IN DETROIT, MICHIGAN, AND DECATUR, ALABAMA. SALES OFFICES IN PRINCIPAL CITIES.

EXPORT DEPT., 13 E. 46TH ST., NEW YORK 16, N.Y.

5382 5818 W 54

Silicone aluminum coating can resist temperatures up to 1700°F...

withstands moisture, mild acids, alkalis, industrial fumes

Uses: For application on condensers, heat lines, ovens, compressors, engine heads, mufflers, and exhaust manifolds.

Features: Coating is capable of withstanding temperatures up to 1700°F. Because of its unusually high heat-resistance, it can be applied over many surfaces heretofore regarded as unpaintable.

Description: Coating is composed of a clear silicone base with an aluminum flake pigment. Coating can be applied by either brush or spray gun. After air drying for 30 minutes, coating is heated to fuse it to surface.

(C-I Extra High Coating is product of Chem Industrial Co., Dept. CP, 3784 Ridge Rd., Brooklyn 9, Ohio... or for more information check 9399 on the Reader Service slip which is located opposite last page.)

Announce epoxy-tar coatings with solids content of 85 to 90%...

five types can be applied in thicknesses up to 10 mils per coat

Uses: For maintenance, equipment exteriors, tank linings, and floors.

Features: Coatings have solids content of 85 to 90% and can be applied in thicknesses of up to 10 mils per coat.

Description: Five types of epoxy-tar protective coatings are available, each type having specific applications depending on service requirements. Coatings show excellent resistance to water, high relative humidity, brine, refinery products, ultraviolet light, hydrogen sulfide, ammonia, acids, alkalis, and salts. General recommendations call for two-coat system, with a total thickness of 20 mils.

(Carbomastic series of protective coatings are product of Carboline Company, Dept. CP, 331 Thornton Avenue, St. Louis 19, Missouri... or for more information reader may simply check 9399A on the Reader Service slip which is located opposite last page.)



For more information on product at left, specify 9400... see information request blank opposite last page.

Yours FREE!

TECHNICAL LITERATURE

1. VALVE TECHNICAL DATA...

Twelve page technical manual giving design, selection, maintenance and repair data for stainless steel valves.

2. GETTING THE MOST OUT OF YOUR VALVES...

Four page technical discussion explaining selection, installation, inspection and maintenance of stainless steel valves.

3. CATALOG 55D (VALVES)...

Sixty-eight page simplified stainless steel valve catalog includes engineering drawings, weights, size ranges, dimensions and basic material data.

4. CATALOG 55F (FITTINGS)...

Complete stainless steel fitting catalog giving engineering drawings, dimensions and basic material data.

5. VALVES TO COMBAT CORROSION...

75 questions and answers selected from Cooper Alloy valve clinics covering materials, operations, service problems, installation and repair.

6. STAINLESS STEEL VALVES AND FITTINGS IN THE PAPER INDUSTRY...

Eight page technical article covering alloys, valve selection, design factors, installation, maintenance, operation and inspection of stainless steel valves and fittings used by the paper industry.

7. PLASTIC PUMPS...

Four page folder describing the Vanton "Flex-i-Liner" pump. Full and cut-away views, plus performance charts and material selection hints are included.

8. PLASTIC PIPE AND FITTINGS...

8 page catalog on Vanton P-Line (PVC), N-Line (Buna N) and S-Line (Styrene) pipe, valves and fittings.

9. PUMPING CORROSIVES...

Four page article describing the transfer of hydrochloric, formic, lactic acid and salt solutions at Litho Chemical.

10. ADVANCED KNOW-HOW...

Series of case studies showing how advanced know-how made possible the economical production of high alloy products considered difficult or impossible to cast.

11. MATERIALS SELECTION CHART...

Four page chart designed to assist in the selection of the most economical alloy for a given corrosive problem. More than 350 specific corrosives are included.

12. DESIGN CONFERENCE...

Special edition of Newcast containing the technical papers presented at the Cooper Alloy Design Conferences. Subjects include Casting Design, Shell Molding, Cast Weld and New Materials.

13. ALLOY REFERENCE CHART...

Revised four page pamphlet listing alloy designations, applications, properties and analysis of corrosion and heat resisting alloys.

14. STAINLESS STEEL CASTINGS ON PARADE...

Four page folder presenting a variety of cast parts with information as to alloy, weight, application. Complete data chart listing twenty-eight alloys with recommendations for their use is included.

15. NEWSCAST...

An eight page bi-monthly publication devoted to reporting technical material of value to those interested in corrosion resistant castings, fittings, valves and pumps.

COOPER ALLOY

CORPORATION • HILLSIDE, N. J.

① FOUNDRY PRODUCTS DIVISION ② VALVE & FITTINGS DIVISION ③ VANTON PUMP & EQUIPMENT CORP.
 ④ STAINLESS ENGINEERING AND MACHINE WORKS DIVISION ⑤ AIRCRAFT PRODUCTS DIVISION

check here for FREE literature

Name _____ Position _____

Company _____

Address _____

City _____ Zone _____ State _____

When inquiring check 9401 opposite last page

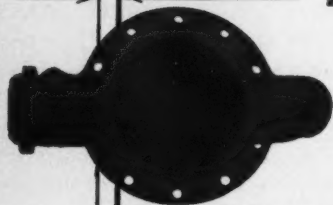


When corrosion "gets your goat"

use this corrosion barrier

STEEL RUBBER

...for Linings

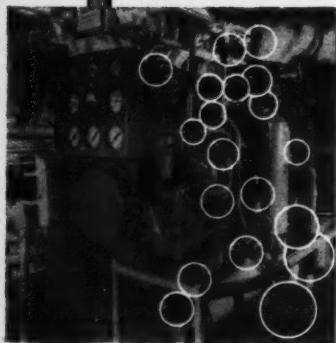


Typical of the intricate shapes lined with La Favorite protective elastomer compounds.

Aggravating, isn't it, when corrosion causes a shut-down for replacement in a critical processing line. End this nuisance now—economically. Line your processing equipment, fluid conveying lines and storage resources with La Favorite high-bond-strength elastomer protective compounds. It pays well. Data sheets? We await your request.

ALL RUBBER

...for Expansion Joints



Nineteen La Favorite expansion joints in this naval power plant block the shivers in pipe lines.

Tremble and shake—stretch and shrink—do these uncontrolled actions in your pipe lines give you the shivers? Don't let them "get your goat" any longer. Insert La Favorite All-Rubber Expansion joints where needed and calm your lines for better performance. Data sheet tells all.

Ask for it today.

LA FAVORITE *Rubber Mfg. Co.*

267 Wagaraw Road • Hawthorne, New Jersey

370A

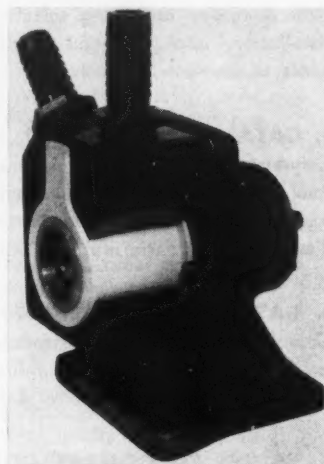
When inquiring check 9402 opposite last page

CORROSION

Flexible Kel-F liner broadens uses of pump

Uses: For applications in pilot plant, laboratory, or production line.

Features: Unusual chemical resistance of Kel-F elastomer liner permits pumping of highly corrosive products which could not be handled with conventional materials.



Cutaway view of pump shows Kel-F liner and fluid passage

Description: Proper selection of pump body block, along with Kel-F liner, enables pump to handle red fuming nitric acid, alkalis, aliphatic solvents, some chlorinated solvents, and other corrosives. Unit can be operated at temperatures up to 300°F. Pumps are available in capacities from 1/3 to 5 gpm.

(Plastic pump is product of Vanton Pump & Equipment Corp., Div. of Cooper Alloy Corp., Dept. CP, 201 Sweetland Ave., Hillside, N.J. . . . or for more information about manufacturer's product, reader may simply check 9403 on form opposite last page.)

This month's Processing and Engineering Data section starts on page 192



Makes stronger joints...faster in PVC PIPING

Here is a team for improving your PVC piping: (1) Tube Turns Plastics' socket type PVC fittings and (2) "ttp" Solvent Cement. The combination gives joints as strong or stronger than the pipe itself. Fittings are injection molded by exclusive Hendry process. Cement is simple to apply with a paint brush as

shown. For complete details on "ttp" socket and threaded types PVC fittings and flanges, and on "ttp" solvent cement, write Tube Turns Plastics, Inc., Dept. PA-12, 2929 Magazine St., Louisville 11, Kentucky.

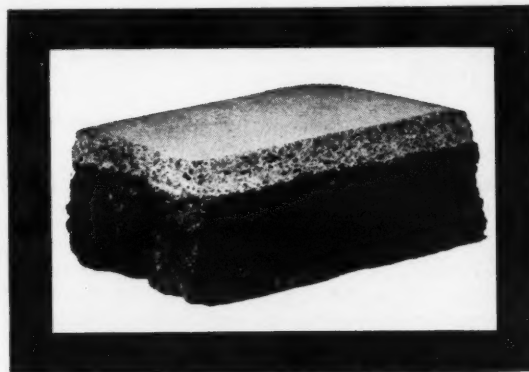


TUBE TURNS PLASTICS, INC.

Louisville 11, Kentucky

Call your TUBE TURNS PLASTICS' Distributor

When inquiring check 9404 opposite last page



Now! BOND NEW CEMENT TO OLD!

Use new Tropical Cement Bond to successfully patch or re-surface broken concrete floors, steps, driveways, shipping docks. Repairs won't crumble, break or flake. Fracture tests show old-new bond undisturbed. Clean, brush on Cement Bond, lay new mix. Save high cost of breaking up old concrete! Withstands heavy traffic. FREE. Your letterhead request brings complete information—write today!

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1128-1210 W. 70th, Cleveland 2, O.
HEAVY-DUTY MAINTENANCE PAINTS SINCE 1903
SUBSIDIARY OF PARKER RUST PROOF COMPANY

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CHEMICAL PROCESSING

**Platinum-base cemented carbide
is corrosion resistant . . .**

cemented tungsten carbide also available for hard facing

A material developed to withstand severe corrosive conditions known as K501, a platinum base cemented carbide, is announced. Product is said to be equal to the noble metals in corrosion resistance — even more wear-resistant. It can be used in form of seal rings, metering orifices, bushings, nozzles, and other parts used in chemical processing.

Another development is Kenface, a cemented tungsten carbide hard facing material. It is reported to be stronger than conventional fused and cast tungsten carbides.

(K501 cemented carbide and Kenface hard facing material are products of Kennametal, Inc., Dept. CP, Latrobe, Pa. Check 9406 opposite last page.)

**After you've read an article,
do you often . . .**

Want More Information?

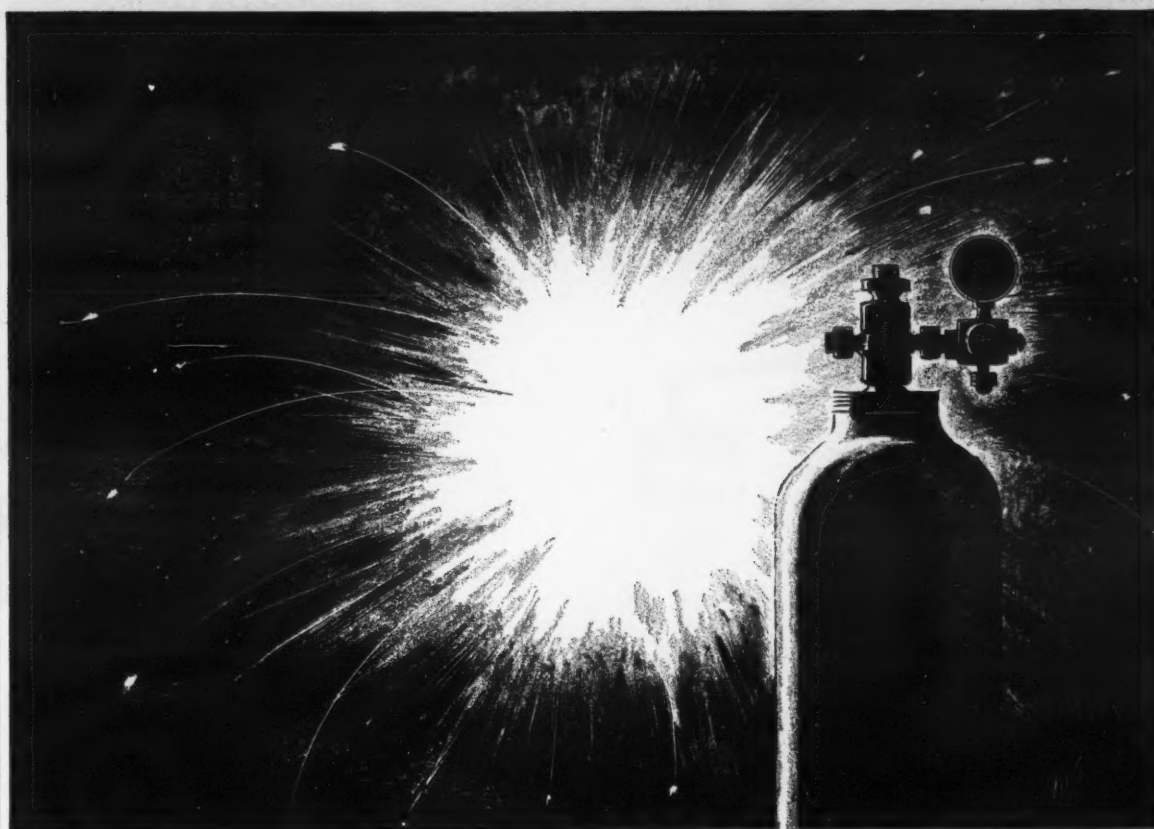
Ever read a magazine article and think — "Now there's something I'd like to know a little more about?"

Probably you have . . . because no matter how long the article, it can't tell you everything. But how do you get more information? Perhaps the magazine didn't tell you . . . and you're too busy to hunt here and there for a name and address . . . a source of further information. So — maybe a good, profitable idea is not followed up, not put into practice in your operations.

When you read **CHEMICAL PROCESSING** you come to no such "dead ends." **Every article has been selected as worthy of your valuable reading time . . .** the non-essentials have been edited out . . . brief, factual material remains . . . **AND**, at the end of every article a "source" paragraph tells you where to get more information.

Convenient for you . . . and **NOTHING MISSING**. Remember, the manufacturer's name and address along with a "key number" at the end of an article is there as an editorial service for you. (Did you wonder, "Is this a new form of advertising?") That information is added to each story by the editors to help you, the reader.

THE EDITORS



Runaway corrosion by fluorine now checked by Monel and Inconel even at high temperatures and pressures

Chemical and petroleum processors handle fluorine today with comparative ease and safety.

Even at pressures as high as 800 psi. or at temperatures well over 1000°F, spontaneous ignition by elemental fluorine and the "slow burn" of corrosion by its compounds is being held in check.

**High nickel alloys
provide check rein**

Monel* nickel-copper and Inconel* nickel-chromium alloys, it has been found, resist attack by fluorine over a wider range of pressures and temperatures than other commonly used construction materials.

In addition, they have excellent physical properties and are easily worked and welded.

**At moderate temperatures . . . in
aqueous systems . . . Monel is used**

Up to about 900°F, Monel alloy shows good resistance to fluorine. It also resists liquid fluorine, hydrofluoric acid, anhydrous HF, HF-steam mixtures and active fluorides.

Currently, Monel alloy is widely used in nuclear fuel separation and HF alkylation processes . . . for fluorine generation cells, heat exchangers, scrubbers, process piping, control instruments and other equipment.

When temperatures go up . . . Inconel

Inconel alloy also provides high resistance to fluorine and other corrosives plus outstanding resistance to heat and thermal shock. A typical

use is in the furnaces where anhydrous HF is reacted with uranium oxide to produce uranium tetrafluoride.

*Registered trademark

**Pamphlets summarize
new technology**

Three helpful pamphlets, "Fluorine Corrosion," "Industrial Handling of Fluorine" and "Continuous Disposal of Fluorine," summarize recent developments in fluorine control. Write for copies. And for help in solving your specific corrosion problems, write to Inco's Development and Research Division.

The International Nickel Company, Inc.
67 Wall Street New York 5, N. Y.

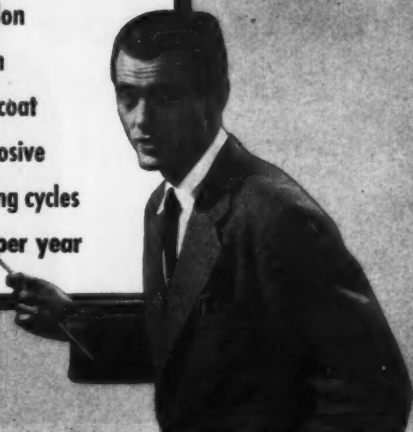


NICKEL ALLOYS...Protection Against Fluorine

When inquiring check 9407 opposite last page

before you buy or specify
protective coatings
STUDY THIS ENGINEERING APPROACH
COMPARE...

- Solids contents
- Coverage per gallon
- Mil feet per gallon
- Mil thickness per coat
- Resistance to corrosive
- Estimated recoating cycles
- Cost per sq. ft. per year of service



AFTER YOU HAVE COMPARED, YOU WILL CHOOSE
CARBOLINE COATINGS

because Carboline Coatings score high on all these basic points. Use this sound engineering approach to compare protective coatings . . . don't buy blindly. You will convince yourself that quality protection is far more important and economical than low initial cost paint.

FREE . . . new 12"x18" comparative guide form blanks for your use in comparing coating systems. Shows method to arrive at cost per sq. ft. per year of service for each system considered. Write for your free copy today.

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A Division of Mullins
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Specialists
in Corrosion Resisting
Coatings and Linings

When inquiring check 9408 opposite last page

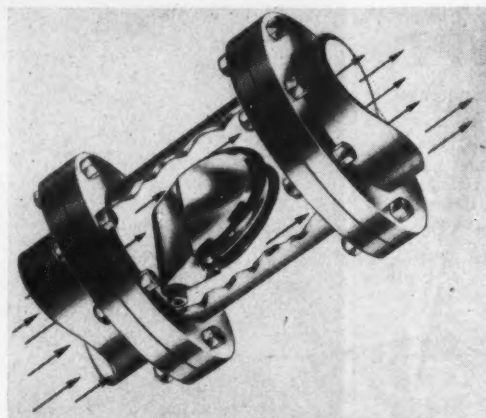
CORROSION CONTROL

**Polyvinyl chloride check valve
can handle corrosives . . .**

unit can be installed in any position, available in several sizes

Uses: For handling corrosive gases, vapors, and fluids.

Features: Valve can be installed in any position for handling salt solutions, fuels and oils, acids and alkalis, food products, and alcohols.



Plastic check valve can handle acids and alkalis

Description: Internals of check valve are of PVC, with sealing members of plasticized PVC, neoprene, or Buna N — all reinforced with nylon for high strength. Hardware is of stainless steel. Unit is available in sizes from 1 to 8".

(Technocheck-PVC check valve is product of Techno Corp., Dept. CP, 16 W. 5 St., Erie, Pa. . . or for more information reader may simply check 9409 on form opposite last page.)

**Teflon orifice plate seal
suited for temperature
of -65 to 500°F . . .**

recommended for wet, dry, corrosive, or high-pressure service

Uses: To give a perfect seal on both orifice plate and fitting seat.

Features: Unit is suitable for temperatures from -65 to 500°F and especially recommended for wet, dry, corrosive, or high-pressure service. Self-lubricating feature makes it particularly good in dry service.

Description: Teflon seal is a simple two-piece unit that locks securely around orifice plate with ring clips and is recessed to receive orifice plate. Plate can be removed by hand pressure alone.

Unit is available from stock in sizes from 2 through

for **PUMPING
CHEMICAL
SOLUTIONS!**



FIG. 6061

Write for
**TABER
BULLETINS
C-355
for
HORIZONTAL
PUMPS
...
for
VERTICAL
PUMPS
V-837**

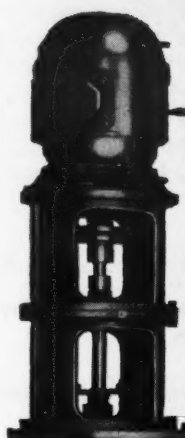


Fig. 19,488

TABER PUMPS ARE
specially built for
handling chemical solu-
tions, efficiently and
economically . . . in the
processing industries.
The Vertical design
permits locating stuff-
ing box above and
out of liquid level.
Therefore nothing
to leak.

BULLETINS
as above gladly
sent on request.

TABER PUMP CO
Est. 1859
320 ELM ST.,
BUFFALO 3, N.Y.

TABER

When inquiring check 9410
opposite last page

CHEMICAL PROCESSING



Teflon seal in open position with orifice plate in approximate position of insertion. Note simple design showing locking rings

12". Patented annular groove allows contraction and expansion, maintaining a continuous seal. Soft texture of seal halts scratches caused by metal-to-metal contact.

(Type TS Teflon orifice plate seal is product of Daniel Orifice Fitting Co., Dept. CP, P.O. Box 19097, Houston, Tex. Check 9411 opp. last page.)

Chemical feeding equipment for water, waste treatment

Four-page bulletin describes characteristics and operations of Neusol unit for feeding chemicals in solution in treatment of waters and wastes. Bulletin describes the feeder as compact, incorporating either one or two positive-displacement diaphragm pumps, and feeding up to a 5% slurry solution.

Bul 340-A is issued by Infilco, Inc., Dept. CP, PO Box 5033, Tucson, Ariz. When inquiring check 9412 on form opposite last page.

Details of acid-proof masonry construction

Several engineering drawings incorporate the latest technology in construction methods for acid-resistant brick installations. Graphically diagrammed are details of acid-proof masonry construction for six typical installations: a pump base, column pad, tank outlets, bell and spigot joints, floors, and trenches.

Engineering drawings are available from Corrosion Engineering Products Dept., Pennsylvania Salt Manufacturing Co., Dept. CP, Three Penn Center Plaza, Philadelphia 2, Pa. When inquiring specify 9413 opposite last page.

B.F. Goodrich



Cotton Producers Association, Carrollton, Georgia.

Rigid Koroseal pipe used for permanent installation where corrosion ruins metal in six months

SULPHURIC ACID used in making super-phosphate used to be carried in heavy duty black iron pipe from tank to mixing station. The strong corrosive action of the acid made replacement of the pipe necessary every six months, causing expense for new pipe and lost time from production.

Then they switched to Koroseal rigid PVC pipe and, according to the plant superintendent, they expect it to be a "... permanent installation". The corrosion problems you have can also be solved by B. F. Goodrich high impact rigid Koroseal PVC pipe. In addition to handling corrosives safely, Koroseal pipe has the strength to take a beating.

Koroseal pipe is unaffected by most acids and alkalis as well as oil, alcohol and salt solutions. Many solutions that eat away metal piping can be safely carried by Koroseal.

Easy to use with Koroseal fittings and valves, this rigid pipe can be threaded on any standard pipe threading equipment.

Koroseal pipe is available in various pressure schedules. Koroseal PVC comes in pipe, tubing, fittings, valves, rod, sheet and custom extrusions.

For full information on rigid Koroseal products fill in the handy coupon. Distributorships for certain areas are still open. Inquiries invited. B. F. Goodrich Industrial Products Company, Marietta, Ohio.

B.F. Goodrich

INDUSTRIAL PRODUCTS

B. F. Goodrich Industrial Products Co.
Dept. K-88
Marietta, Ohio

Please send me free booklets on:

- ☐ Rigid Koroseal Pipe
☐ Rigid Koroseal Sheet

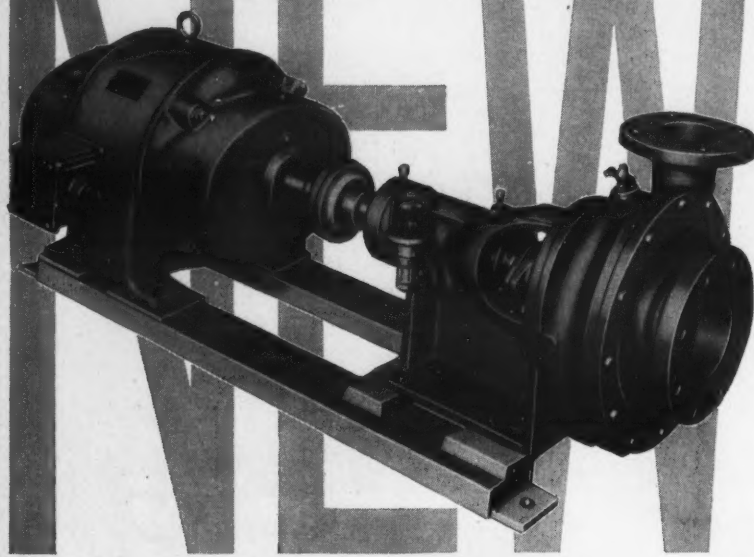
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Company _____

Address _____

City _____ Zone _____ State _____

When inquiring check 9414 opposite last page



New...and in stock!

Ampco Centrifugal Pumps In 316 Stainless

Hydraulic range
includes capacities
to 600 gpm.,
heads to 160 feet.

Pedestal assemblies
available for
base-mounted coupling
connections.

Close-coupled
connections fit NEMA
standard pump motors.

New, high-speed pumps for handling clear liquids
and fine slurries not corrosive to GR. 316 SS.

Although stock items, these pumps include fea-
tures which, until now, have been available only
on special order for custom-built models:

1. **Correct-design closed impellers** — for greater efficiency, longer life.
2. **Wear rings** — to save the casing, prevent expen-
sive repairs, reduce down-time.
3. **Shaft sleeves** — to give greater operating economy,
eliminate worn shafts, cut maintenance costs.

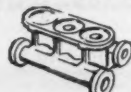
Ask your Ampco Pump Distributor to show you
how these off-the-shelf pumps are easily adapted
to the particular requirements of your specific
application. Write for his name—and Bulletin P-3C.

AMPCO METAL, INC.

Dept. CP-12, Milwaukee 46, Wis. • West Coast Plant: Burbank, Calif.

THE METAL WITHOUT AN EQUAL

AMPCO — ONE-SOURCE SERVICE FROM RAW MATERIAL TO FINISHED PRODUCT



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EXTRUSIONS



CAST PIPE FITTINGS



FABRICATIONS



SHEET AND PLATE



MACHINED PARTS

PR-23

When inquiring check 9415 opposite last page

CORROSION

**Weather-tight protection
results with aluminum
roof coating . . .**

keeps buildings cool in sum-
mer, warm in winter

Uses: For coating concrete,
metal, felt, slate, and roofs made
of other materials.

Features: Silvery finish acts
like a mirror to reflect sun's rays.
Buildings are kept cool in the
summer and insulated against cold
in the winter.

Description: Coating contains
aluminum throughout, blended
with a vehicle and asbestos fibers.
Aluminum does not rise to the
surface. One gallon covers up to
200 sq ft. It can be applied by
brush or spray.

(Aluminum roof coating is prod-
uct of Stonhard Company, Dept.
CP, 1306 Spring Garden St., Phil-
adelphia 23, Pa. . . or for more
information check 9416 on form
opposite last page.)

**Provides protective film
for metal surfaces . . .**

coating is non-flammable,
resists outdoor exposure

Uses: For protection of metal
surfaces.

Features: Coating has stood
up well when subjected to a va-
riety of conditions in outdoor
exposure tests. Coating resists
fingerprint corrosion when a met-
al part is subjected to handling
before or after application. Coat-
ing is extremely adherent.

Description: Water-based,
non-flammable coating is an
emulsion of waxes and oils in
combination with selected corro-
sion inhibitors. When applied by
dip or spray, it forms a uniform-
ly firm, wax-type coating.

(No-Ox-Id Safeguard coating is
product of Dearborn Chemical
Co., Dept. CP, Merchandise Mart
Plaza, Chicago 54, Ill. . . or for
more information check 9417 on
form opposite last page.)

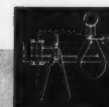


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PROCESSING ECONOMY**



Unique thin-wall tank design provides maxi-
mum heat transfer for economical processing.
Double stainless steel tank walls "quilted" for
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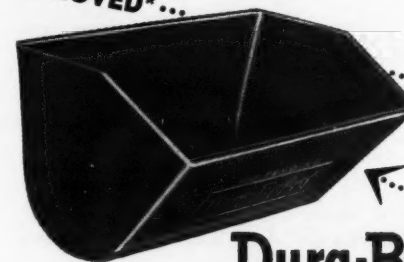


A Complete Engineering Service

STAINLESS PRODUCTS CORPORATION
BELDING, MICHIGAN

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IMPROVED* . . .



Dura-Buket

lasts longer . . . saves money!

*Special Plastic by Fiberite Corp.

Proved and IMPROVED: Yes, four
years of continued research and testing
under actual severe conditions, have
proved that the revolutionary improved
Dura-Buket outwears, outlasts ordinary
elevator buckets many, many times.
Dura-Buket is better than ever because
it's made of a special strong and shock
resistant plastic developed by the
Fiberite Corporation. Order your sup-
ply today.

And Dura-Buket gives you these im-
portant trouble and money-saving
extras:

1. Special shock-resistant
plastic by Fiberite.
2. Strong and shatter-
proof.
3. High speed and light-
weight.
4. Spark and static-proof
for safety.
5. Self-cleaning for high
sanitation.

FOR COMPLETE INFORMATION AND PRICES WRITE TO:

Dura-Buket DIVISION
NATIONAL OATS COMPANY
EAST ST. LOUIS, ILLINOIS

When inquiring check 9419 opposite last page

CHEMICAL PROCESSING

Recommended surface preparation for red lead paints

Nine-page technical publication gives detailed information on recommended surface preparation of steel for red lead paints. Factors to consider in selecting a method of surface preparation are given, along with available procedures.

Technical Letter No. 11 is issued by Lead Industries Assn., Dept. CP, 60 E. 42nd St., New York 17, N.Y. Specify 9420 opposite last page.

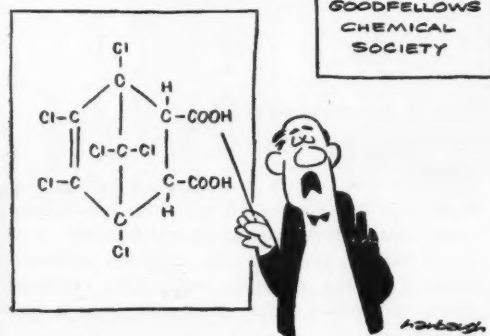
Tests on acid-resisting lumber show it to have superior properties . . .

recent tests run at soap company show wood suitable for tubs

A recent series of tests conducted by a large soap company on the acid-resisting lumber, Autracon, show it to be superior in chemical resistance and other properties. In the tests the wood was exposed to the corrosive services for which company uses wood tubs. Autracon is found to be somewhat better than Douglas Fir, company's usual choice.

Autracon is an extremely hard wood obtained from outside the United States. It has long lasting qualities and high resistance to decay. It is resistant to dilute acids and suitable for lining of acid vats. It is also resistant to termites. Wood has high strength.

(For further information on Autracon acid-resisting lumber contact F. Henry & Sons, Ltd., Dept. CP, 73-29 174 St., Flushing 66, New York, N.Y. . . . or check 9421 on form opposite last page.)



"Now the hydrogen molecule gets the ball from center, fakes to the chlorine, picks up his interference and . . ."



New PVC compound stops corrosion!

Discover how rigid polyvinyl chloride pipe, valves and fittings can cut your plant's share of the nation's annual bill for battling corrosion—a staggering \$6 billion! You can save on maintenance costs and reduce shutdowns caused by either internal or external corrosion.

Injection molded from a *special, newly developed* DIAMOND PVC rigid compound—the lightweight valve you see above* will resist attacks by weather and a wide range of acids, alkalis, salt solutions, alcohol, and other chemicals.

Easy to install, it's nontoxic, nonsparking and

nonflammable. And its smooth inside surface lowers flow resistance and prevents deposit build-ups. Temperature limit for continuous service is 165° F.

Experience further demonstrates that polyvinyl chloride compounds based on this new DIAMOND development are ideally suited to molding operations.

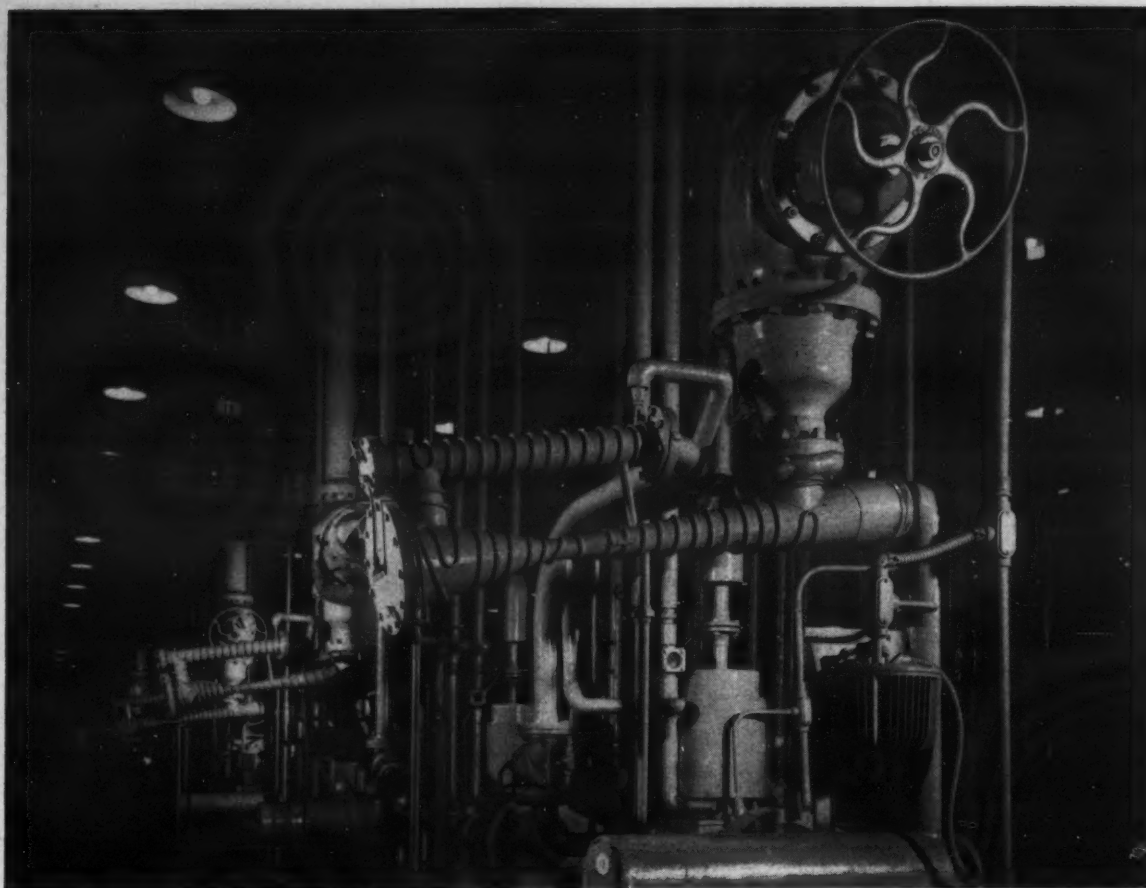
For full information on this remarkable new rigid compound, call or write DIAMOND ALKALI COMPANY, 300 Union Commerce Building, Cleveland 14, Ohio.

*Produced by Tube Turns Plastics, Inc., Louisville, Kentucky. DIAMOND does not make PVC pipe, valves or fittings.



Diamond Chemicals

When inquiring check 9422 opposite last page



These Crane valves holding 25 microns absolute pressure after 2 years on vacuum service

The Case History—Valves frequently are the most critical points in a vacuum system. But that's not the case with this large Southern light metals refiner.

This plant reports no trouble or expense over a 2-year period in maintaining a vacuum of less than 25 microns absolute for its distillation process.

The tight-holding valves installed about 2 years ago on the lines from vacuum pumps shown above are Crane No. 1611 diaphragm pattern. These 12-in. packless iron body valves are used about once daily.

They've allowed no in-leakage at the seat, bonnet-joint, or through the diaphragm. No maintenance whatever has been given the valves since installed. They operate easily and look good for such service indefinitely.

This high efficiency performance is mainly due to Crane separate disc and diaphragm design. The diaphragm used as a bonnet seal only is not subject to destructive crushing. Conventional type disc and body seat provide a metal-to-Neoprene seating that's ideal for vacuum and hard-to-hold fluids.

Moderately priced, Crane diaphragm valves deserve your consideration for many ordinary services, as well as sludges, slurries and corrosive fluids. They are made in a wide variety of body and trim materials, in 1/2 to 12 in. sizes.

Ask your local Crane Representative about them, or write to address below for literature.



CRANE VALVES & FITTINGS

PIPE • KITCHENS • PLUMBING • HEATING

Since 1855—Crane Co., General Offices: Chicago 5—Local Service Everywhere Through Branches & Wholesalers

When inquiring check 9423 opposite last page

CORROSION CONTROL

Fluorocarbon sealants resist fuming nitric

Offer solution to difficult sealing and caulking problems

Uses: For critical sealing and caulking applications.

Features: Sealants are completely resistant to fuming nitric acid and other highly oxidizing acids, salts, and alkalis.

Description: Sealants are made from a fluorocarbon resin known as Fluran, a grey-white material composed of plasticized fluorocarbon resin plus chemically inert fillers. Three different types of the material are available. J-10, supplied in rod form, is of hard rubbery consistency and requires heating to 150°F before application. J-20 (moderately soft) and J-30 (soft) can be easily applied directly from can after warming contents to 100-125°F. J-20 and J-30 can also be applied with a caulking gun.

Fluran is a completely stable material with indefinite shelf life. It is non-volatile, non-flammable, non-toxic, and contains no solvents. The temperature resistance of the fused material is in the 225 to 275°F range. Due to its thermoplastic nature, material can be used as a permanent or temporary sealant. Maximum adhesion and resistance to permeation are obtained after fusing the material by subjecting it to a temperature of 300°F for 1/2 to 1 hr. Due to its high initial cost, in the neighborhood of \$55.00 per lb, material is suggested at present only for the most difficult and critical applications.

(For additional information on Fluran Sealants and putties contact Chemical Process Equipment Division, U. S. Stoneware Company, Dept. CP, Akron 9, Ohio . . . or for more information about manufacturer's product, reader may simply check 9424 on form opposite last page.)

Charts chemicals conveyed by polyethylene pipe

Of particular interest in eight-page bulletin on flexible polyethylene pipe is a chart which lists many chemicals which can be satisfactorily conveyed by the plastic piping. Bulletin includes sizes of piping available, installation instructions, properties, and estimated flow rates.

Bul CE-57 is issued by American Hard Rubber Co., Dept. CP, 93 Worth St., New York 13, N.Y. When inquiring specify 9425 on the convenient Reader Service slip which is located opposite last page.

**Corrosion-resistant coatings,
weathersealing materials**

Factual data on protective coatings and synthetic rubber compounds used for weathersealing buildings are contained in 12-page catalog. Information is given to show how coatings protect metal, masonry, and wood against acids, alkalis, alcohol, oils, gasoline, solvents, salts, and water. It also describes how metal, masonry, and glass are given a permanent, weathertight seal with the synthetic rubber compound. Case history information is included, along with a chart on the chemical resistance of a number of protective coatings.

Catalog on protective coatings and weathersealing materials is issued by David E. Long Corp., Dept. CP, 220 E. 42nd St., New York 17, N.Y. Specify 9426 opposite last page.

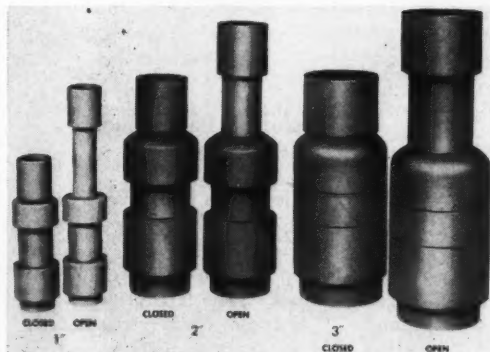
**PVC expansion joint
now in production . . .**

permits use of rigid PVC piping in systems subject to thermal cycles

Uses: For use with rigidly fixed PVC piping systems subjected to fluctuating temperatures cycles.

Features: Availability of the slip type expansion joint extends applications of corrosion-resistant PVC piping systems.

Description: Expansion joint is made in 1, 2, and 3" sizes and may be used with piping of smaller diameters by employing reducing bush-



PVC expansion joint in open and closed positions

ings. All sizes allow an expansion of $3\frac{3}{4}$ ". Joint has a neoprene O-ring packing. Unit has been tested at pressures up to 325 psi and temperatures up to 140°F.

(PVC expansion joint is a product of Tube Turns Plastics, Inc., Dept. CP, 2929 Magazine St., Louisville 11, Ky. Check 9427 opposite last page.)



Constructed entirely of Alcoa Aluminum, world's largest all-aluminum tank* stores 2½ million gallons of ammonium nitrate

High resistance to the corrosive action of ammonium nitrate was a big factor in choosing ALCOA Aluminum for the world's largest all-aluminum storage tank. The Mississippi River Chemical Company's primary consideration in erecting the giant tank was the need for uninterrupted storage service with a minimum of maintenance. ALCOA Aluminum's natural resistance to weathering and ammonium nitrate corrosion assured the company of long service with low maintenance costs.

ALCOA Aluminum is used extensively throughout the chemical and petroleum industries to handle many corrosive solutions. This economical metal has a proven record of long, trouble-free service in tank cars, piping, drums, prilling towers and storage tanks.

Write today for detailed information on how ALCOA Aluminum can be used effectively in your operation. Take advantage of ALCOA's more than 30 years of experience with aluminum in hundreds of applications. Send for the new, 80-page book, *Process Industries Applications of Alcoa Aluminum*. It contains the latest performance and design data on ALCOA Aluminum. Write on your company letterhead or use the coupon.

* World's largest all-aluminum storage tank at the Selma, Missouri, plant of Mississippi River Chemical Company. The tank stands 26 feet high, has a diameter of 128 feet, is constructed of more than 300,000 pounds of Alcoa Aluminum, holds 2½ million gallons of 83% ammonium nitrate solution. Field erected by Chicago Bridge & Iron Company, Chicago, Illinois. Designed by Fluor Corporation, Ltd., Los Angeles, California.

TUNE IN
"THE ALCOA HOUR"
—NBC TELEVISION.
ALTERNATE SUNDAY
EVENINGS.
SEE YOUR NEWSPAPER
FOR TIME AND STATION.

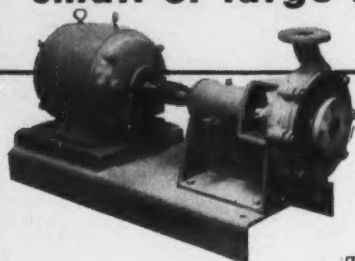


Aluminum Company of America
902-M Alcoa Building, Pittsburgh 19, Pennsylvania
Please send me your new FREE book, *Process Industries Applications of Alcoa Aluminum*.

Name _____
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City _____ Zone _____ State _____

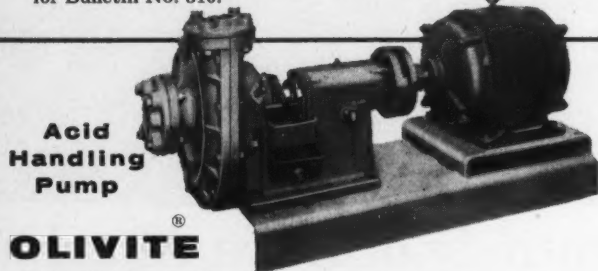
When inquiring check 9428 opposite last page

for highest operating efficiencies in handling small or large flows —



**OLIVER
TYPE L
Centrifugal
Pump**

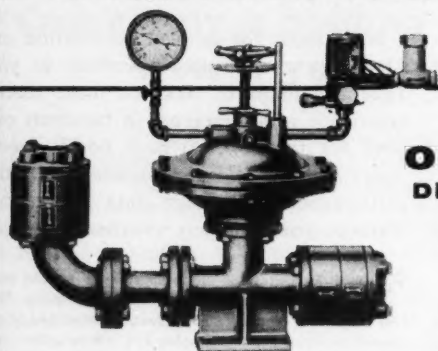
The Type L is a corrosion resistant chemical pump featuring a high cut-water or tongue of the volute. This makes the pump self venting . . . improves priming. Available in four standard sizes — 1", 1½", 1¾" and 2". Contact parts are made of Alloy 20 or Type 316 stainless steel, bronze or cast iron. 1" model in Alloy 20 stainless steel only. Write for Bulletin No. 310.



**Acid
Handling
Pump**

OLIVITE

An efficient, durable pump for handling hot or cold corrosive solutions. Special rubber or neoprene base composition lines casing, cover and impeller. It does not crack or slough off even under high temperatures. Sizes available — 1½", 2" and 4". Write for Bulletin No. 308-R2.



**OLIVER
Diaphragm
Slurry
Pump**

This pump is designed to operate without mechanical linkage for transmitting force to diaphragm — source of power is compressed air. There is no motor, stuffing box or packing. Capacity quickly changed from zero on up without stopping operations. Pump is ideally suited for handling slurries containing fragile crystals or floc. Six sizes available. Write for Bulletin No. 309-R.

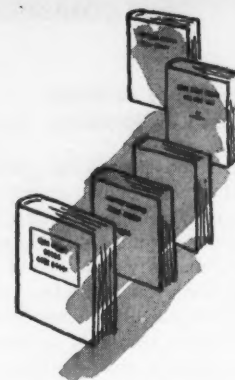
Dorr-Oliver engineers, specialists in pump applications, will gladly discuss your pumping problems. Write for their assistance.



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STAMFORD • CONNECTICUT • U.S.A.

When inquiring check 9429 opposite last page

Recent Books



Synthetic Ion-Exchangers

*Reviewed by E. L. GROVE
Assistant Professor of Analytical Chemistry
University of Alabama*

The author, G. H. Osborn, discusses briefly and clearly recent developments in the theory and application of ion-exchange resins. This 191-page book contains a concise treatment of the structure, preparation, and general properties of such resins, and includes a brief discussion and performance data for each of the principal resins. Author then briefly covers recent work, some advantages and disadvantages, applications, and some future possibilities in the areas of analytical aspects, therapeutic applications, materials of low solubility, ion-exclusion, and ion-exchange membranes. Book contains a good bibliography of recent and important papers for reference, and fourteen illustrations and tables.

This work should suggest to the reader possible solutions to problems and ideas for future investigation. This reviewer found himself considering possibilities such as the use of complexing agents for separation of ions and for the preparation of special resins.

To obtain "Synthetic Ion-Exchangers" remit \$6 direct to The MacMillan Company, Dept. CP, 60 Fifth Avenue, New York, N. Y. Specify 9430 opposite last page.

Chemical Engineering Kinetics

*Reviewed by D. S. DAVIS
Coordinator of General Engineering Studies
University of Alabama*

In "Chemical Engineering Kinetics," Professor J. M. Smith of Purdue University has given us a worthy companion to his "Introduction to Chemical Engineering Thermodynamics." In 402 pages he accom-

plishes masterly treatment of reactor design, deals competently with homogeneous batch and flow reactors, and devotes separate chapters to semi-batch reactors, catalysis, the kinetics of solid catalytic reactions, transfer of heat and mass in reactors, and the design of gas-solid reactors. Wisely he preceded his presentation of kinetics with a review of thermodynamics.

Readers will be grateful for the generous illustrative examples that appear in gratifying detail, the helpful tables of nomenclature that close each chapter, the 58 clearly-stated problems, and the information contained in the two appendices.

Always practical, the author stresses engineering applications and strengthens his work with excellent line cuts. Altogether, the book is one of the most important of the recent newcomers to McGraw-Hill's series in chemical engineering.

To obtain "Chemical Engineering Kinetics," remit \$8 direct to the McGraw-Hill Book Co., 330 West 42nd Street, New York 36, N. Y.

The Historical Background of Chemistry

Though the title of this book may remind the reader of Slosson's "Creative Chemistry" and Furnas' "The Next Hundred Years," this book is in a different class altogether. First, "The Historical Background . . ." is documented, rather heavily written, and in short, a text; second, it does not catch what Slosson called "the romance of chemistry."

Taken for what it is, this history makes a good reference. Extensive bibliographies at the end of each chapter refer to books currently available rather than original source material.

The author holds to his aim of following the development of chemistry through the

reviews of current technical and reference work
... summarized for you by authorities
in the field with the CP staff

thoughts and ideas of the chemists rather than through the details of their lives. Though he admits that this volume leaves many gaps in the history of chemistry's development, author Leicester has produced a single book which shows the main stream of chemistry from its ancient beginning through 1955. It is probably the most complete historical work available on chemical theories since 1930.

To obtain a copy of "The Historical Background of Chemistry," by Henry M. Leicester (241 pages, illustrated) remit \$6.00 direct to John Wiley & Sons, Inc., Dept. CP, 440 Fourth Ave., New York 16, N.Y. . . . or for more information check 9431 on the convenient Reader Service slip which is located opposite last page.

The Chemical Constitution of Natural Fats

Reviewed by GEORGE M. TOFFEL
Associate Professor of Chemistry
University of Alabama

Every student and investigator concerned with natural fats will find this monograph very valuable. This third edition contains an increase of 226 pages over the second edition. Several chapters have been completely rewritten to include extensive information gained by methods developed since 1948. This new knowledge makes it possible for the author to present a fairly complete picture of glyceride structure over a whole range of natural fats. The fact that the author, T. P. Hilditch, is an active research worker and not just a book compiler shows up throughout the volume. He is one of the greatest authorities in the field of fat chemistry. Much of our present knowledge of compositions of glycerides has been obtained by the use of his methods. A large number of fats has been characterized in the author's own laboratory.

General plan and purpose of the book remains the same as those of former editions. Natural fats are treated as a group of organic chemical compounds, systematically described, commencing with fats of minute aquatic flora and fauna and then proceeding to fats of higher biological forms. Little attempt was made to collect all data on fats, such as melting points, iodine numbers, and saponification numbers, which are available in most standard works. Fats are treated in much the same way that others describe terpenes and proteins: as a mixture of chemical individuals.

Introductory chapter gives a short review of the field covered and facilitates use of monograph. Chapters 2 through 4 give analyses of component acids of fats. Fats of aquatic plants and animals are treated together, since they have so much in common. Next three chapters describe component glycerides of fats. This knowledge has been considerably increased since the second edition. Chapter 8 presents some aspects of biosynthesis of fats. A thorough review of the present knowledge concerning chemical constitution of natural fatty acids in chapter 9 should be useful to everyone in the field.

Chapter 10 presents a review of synthetic glycerides and a description of naturally occurring higher aliphatic alcohols and ethers. Last chapter, of special interest to research workers, has been revised and expanded to give some of the most recent experimental techniques employed in quantitative investigations of fats.

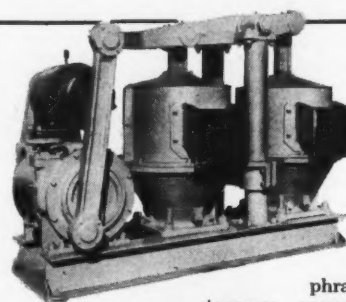
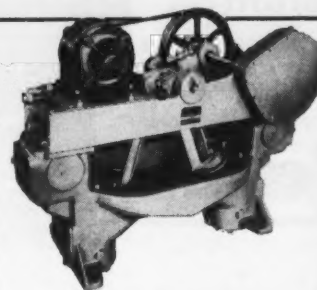
Five different indexes have been prepared for the new edition to facilitate use of the monograph. Logic, approach, and techniques described by the author should inspire others to explore the wealth of ideas and empirical rules presented.

To obtain "The Chemical Constitution of Natural Fats," remit \$16 direct to John Wiley and Sons, Inc., Dept. CP, 440 Fourth Ave., New York, N. Y. When inquiring specify 9432 on form which is located opposite last page.

for maximum flow,
long life,
minimum maintenance

DORR-OLIVER Type V Pump

For removing underflows from Thickeners and Hydro-separators by positive displacement. Twin pumping chambers with individual suction and discharge connection for each chamber. Adjustable stroke while pump is running. Six sizes to handle up to 30 cu. ft. of pulp per minute. Write for Bulletin No. 5001.



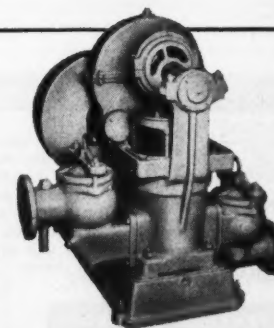
DORR-OLIVER Type W Pump

A rugged duplex diaphragm pump designed for big tonnage operation featuring variable stroke adjustment while pump is running. Available in 6" and 8" models to handle up to 75 cu. ft. of pulp per minute. Write for Bulletin No. 5002.

DORR-OLIVER Plunger Pump

A dependable unit for pumping sludges in municipal and industrial water and waste treatment plants. Adjustable eccentric permits stroke variation of 1" to 5". Can be controlled by program time clock for optimum 24-hour operation. Write for Bulletin No. 5182.

Dorr-Oliver engineers, backed by 51 years of pump design and application, will gladly discuss your pumping problems. Write for their assistance.



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WORLD-WIDE RESEARCH • ENGINEERING • EQUIPMENT
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When inquiring check 9433 opposite last page

DORR-OLIVER PUMPS

Need Adjustable-Constant Flow Rates?

**DON'T
Build a
System ...**

Install a
Kates*

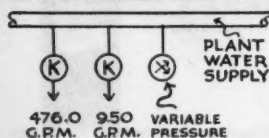


* KATES Direct-Acting Flow Rate Regulators are complete in themselves, requiring no outside connections except inlet/outlet piping; for light slurries, clear liquids, and many suspensions; hold constant flow despite 125-psi jumps or drops in inlet-to-outlet pressure.

Economy may not be your principal reason for selecting a Kates regulator, but added to the single-unit compactness and no-hunt, no-lag features it is certainly a valued extra. And you will save on maintenance, too. Kates regulators are designed to eliminate wire-drawing, and the only packing is on the infrequently-used dial stem.

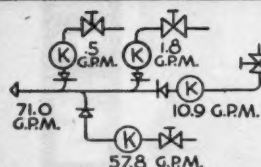
Write us for more details on the unique operating principles and practical design features of Kates flow rate regulators. But first, here are some of the problems that Kates has solved for others — *economically*.

PROCESS WATER CONTROL



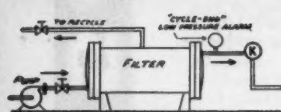
Pressure of most plant water fluctuates badly — whether it comes from city mains or in-plant pumps. If you need selected-constant flow, from 0.02 to 550 GPM, DON'T build a system. Install a Kates.

PROPORTIONATE BLENDING CONTROL



Where many ingredients go into one blend, and must be in exact proportion, a control system for each ingredient would cost plenty. But a Kates control on each feed does the job inexpensively, and each unit can be reset for a blend change.

PRESSURE FILTRATION CONTROL



As filter cake builds up, a constant valve-jockeying is needed to smooth out flow. A Kates control in the effluent compensates for rising pressure drop, keeps filter at best rating.

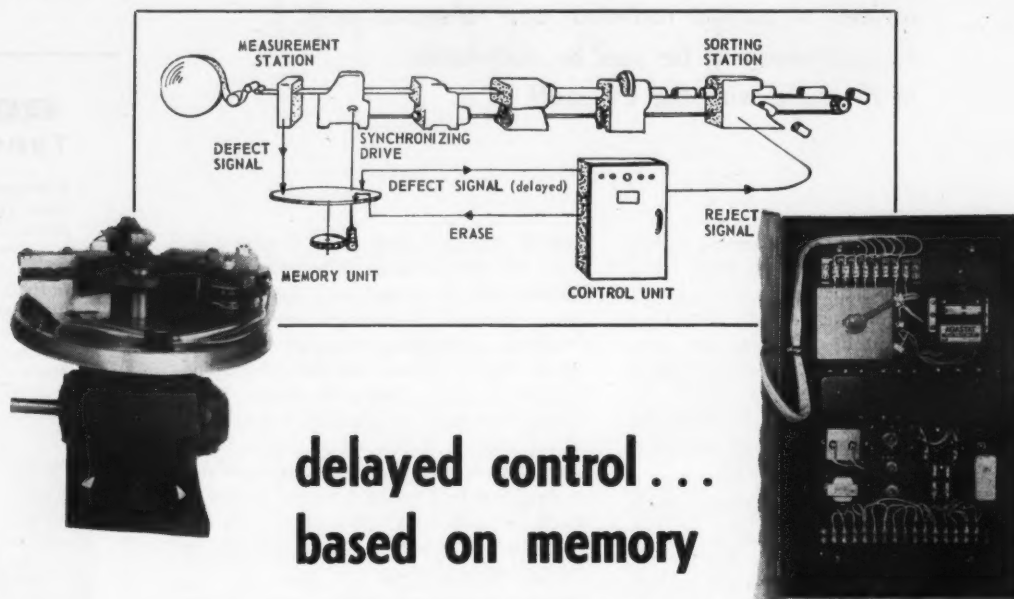
Write for Technical Bulletin — TODAY

Kates

W. A. KATES COMPANY
Department A.
430 Waukegan Rd.
Deerfield, Illinois

When inquiring check 9434 opposite last page

Instrumentation & Control



**delayed control ...
based on memory**

**uses simple elements of
magnetic read-write to control
continuous process lines**

Control cabinet interior

Uses: Originally developed for *delayed control* of high-speed material process lines and automatic sorting of products moving through complex conveyor systems, magnetic memory control system can be adapted to any process line where automatic measurements of color, strength, thickness, and other physical characteristics control subsequent operations.

Application is limited by small number of electrical inputs — only two can be handled by one unit. However, other models of the control system will accommodate a greater number of inputs.

Features: Magnetic control system has read and write speeds above those of electro-mechanical devices. System is of simple design and has sufficient resolution to handle many simple "go-no go" problems. In comparison, magnetic drum and magnetic tape systems have higher resolution but are of a more complex nature.

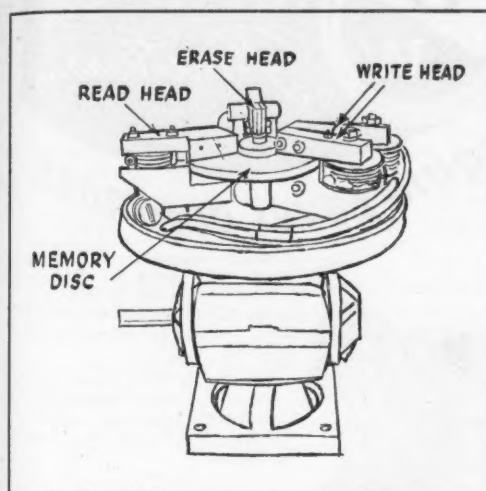
Description: Heart of memory unit of magnetic control system is a hardened steel disc capable of being magnetized. Electrical signal is received from measurement station located along processing line. Disc rotates in synchronism with processing or conveyor line. Electrical signal is used

to magnetize narrow sectors of the disc. Read-out occurs when material measured reaches an "action" station, which can be after several stops of the line. After read-out and action, disc is erased and is ready for reuse.

Almost any primary measuring element which furnishes an electrical signal can be used to initiate a "memory" action. Control system will accept signals from photoelectric controls, beta gages, ultrasonic detectors, magnetic detectors, if required. System is relatively insensitive to process or conveyor line speeds as no exact gearing or coupling ratio need be specified between processing line drive and input shaft of memory unit. Because of no physical contact between magnetic heads and memory disc, system should have long-term reliability.

Since memory of system is based on magnetic flux marks which remain until erased from the memory disc, read-out occurs regardless of speed of line, even including stops.

In continuous material processing line for plastic sheet, paper, or paper products, a photocell might be used to detect off-color areas or otherwise defective spots. Thereafter, the strip may be further



Memory disc is key to magnetic control system.
Disc is capable of being magnetized

processed and then cut into sheets. Memory delay system will remember location of each defective spot — up to 50 — and cause the sorting mechanism to pull out all defective units.

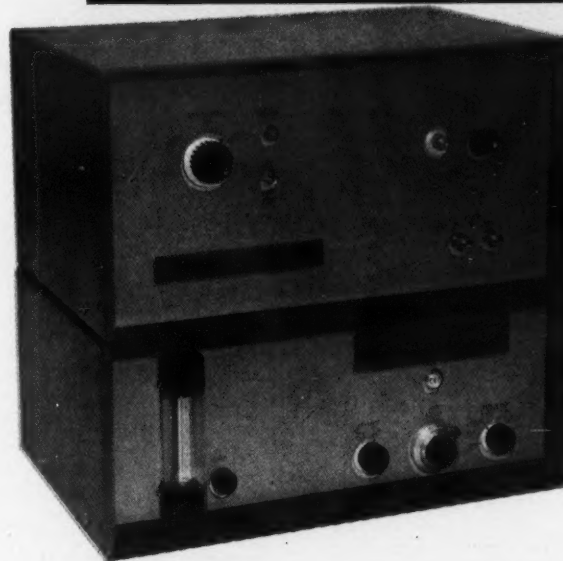
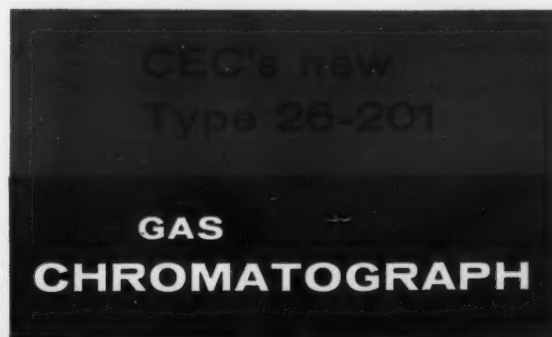
Instrument has also been used for control of warehousing operations, supplying automatic switching to direct items to two or more destinations. A long conveyor line may transport products to several loading platforms or docks. Correct destination can be designated by manual push buttons when item enters conveyor.

Entire system consists of memory unit, control unit, plus measurement and action stations with a means for synchronizing drive between memory unit and process line. System operates on 110v AC, 60 cps and requires 40 watts. Single output signal energizes a power relay having contacts rated for a 10 amp inductive load. Maximum number of separate marks that can be recorded on memory disc is 50 with minimum spacing between marks of 3". Combined weight of memory and control units is 48 lb. Memory unit is 9 1/2" high, 8" in diameter. Control unit is 9 1/2"x12 1/4"x20 1/4".

(Model 1000 Magdelay is product of Automation, Inc., Dept. CP, 212 Worcester St., Wellesley Hills 82, Mass. . . . or for more information check 9435 on the convenient Reader Service slip which is located opposite last page.)

This month's Processing and Engineering
Data section starts on page 192

announcing . . .



Consolidated Electrodynamics

300 North Sierra Madre Villa, Pasadena, California

ELECTRONIC INSTRUMENTS FOR MEASUREMENT AND CONTROL

COMPANY-OWNED SALES AND SERVICE OFFICES THROUGHOUT THE UNITED STATES

When inquiring check 9436 opposite last page

Already hailed as the greatest analytical development in the past 10 or 20 years, gas chromatography gains new flexibility, wider range, and greater precision with CEC's new Type 26-201 Gas Chromatograph. Modular design makes it possible to buy the exact type and size system you need, then expand it with minimum additional investment as your analytical needs change. Several analyzer units may be operated from a single control unit, and since each analyzer's temperature may be independently set, change-over time is cut to a minimum, and over-all system speed remains high.

There is a place for the 26-201 Gas Chromatograph in practically every laboratory faced with a heavy load of quantitative gaseous and liquid mixture analysis. Both as a replacement for older instruments (e.g., intermittent stream analyzers) and as a supplement to mass spectrometers and infrared instruments, this new instrument can mean an important saving in dollars and man-hours. Write today for a complete description and specifications . . . Bulletin CEC 1831-X4.



CHECK THESE FEATURES . . .

MODULAR DESIGN . . . expandable as analytical needs change; columns easily interchanged; quick change-over between analyzer units and central control unit.

WIDE TEMPERATURE RANGE . . . temperature of the analyzer continuously adjustable from 60°C to as high as 250°C, and regulated to within 0.5°C.

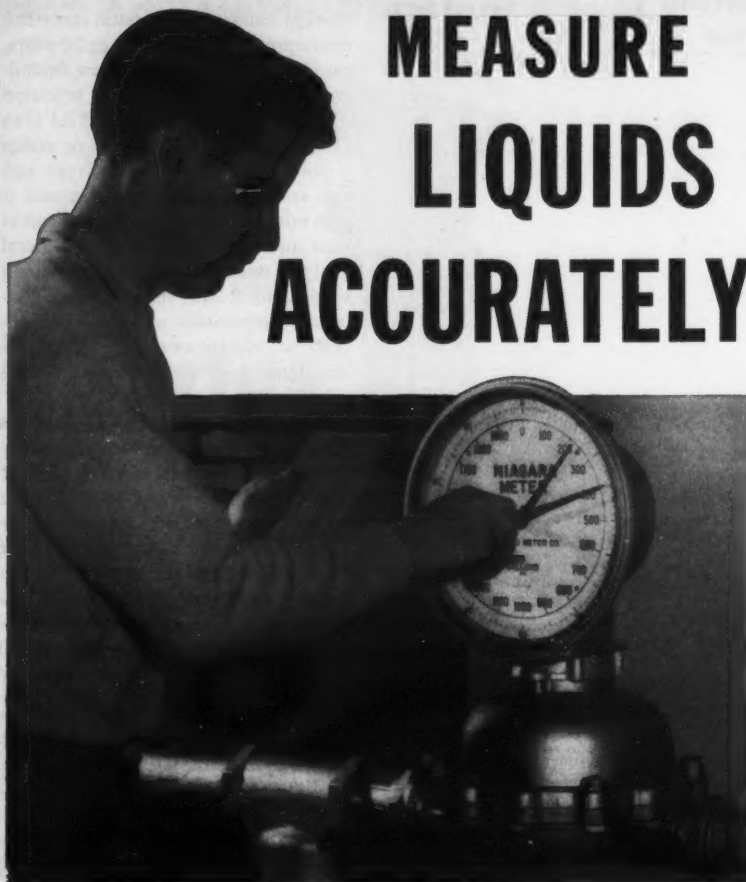
HIGH REPRODUCIBILITY . . . internal sample valve, heated to the temperature of the analyzer, controls size of gas samples within ±0.5%.

VARIABLE TEMPERATURE CONTROL . . . regulation within ±0.5°C over continuous range of 60°C to 250°C.

SMALL SAMPLES . . . microsamples make instrument valuable in research applications.

VERSATILE . . . operates with either absorption or partition columns to handle wide variety of compounds.

MEASURE LIQUIDS ACCURATELY



UP TO 1000 GPM WITH NIAGARA Displacement Meters

Measurement of liquids in any process is only as dependable as the accuracy of the measuring equipment. Niagara Meters measure volumetrically. Each rotating cycle of the piston displaces a fixed volume which remains constant for any specified liquid and temperature range. Niagara Meters are individually tested and calibrated to close tolerances at all rates of flow within their capacity.

Accurate measurement prevents waste and loss. Liquid formulas can be processed with accuracy insuring greater uniformity of product.

Learn all the facts . . . Mail the coupon for complete information.

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METER CO.**
2892 Main Street
BUFFALO 14, NEW YORK

Please send me information on the complete line of Niagara Meters.

Liquid.....
Flow g.p.m..... Temp.....°F
Name.....
Company.....
Address.....

When inquiring check 9437 opposite last page

INSTRUMENTATION

**Measures low torque
in both directions
to ± 5 percent . . .**

shows torque on two linear scales spread over 300°

Uses: Measuring low torque of either clockwise or counter-clockwise rotation.

Features: Torque gage reads on two linear scales, each spread over 300° on one-inch diameter watch face.

Description: Scales of torque gage are different colors for easy



Reads torque in both directions

identification. Ranges are 0.1 to 1.2 and 1.0 to 20 ounce-inches. Accuracy is $\pm 5\%$ of full scale.

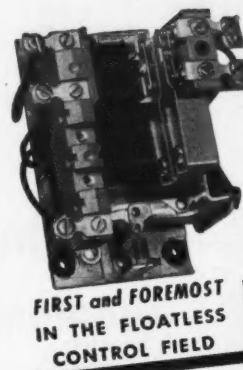
Gage is contained in anodized aluminum case $1\frac{1}{8}$ " diameter and 3-7/16" long. Unit weighs 7 oz.

(Torque-Watch is product of Waters Mfg. Co., Dept. CP, P.O. Box 368, South Sudbury, Mass. Check 9438 opposite last page.)

Gives data on viscometer measuring elements

Two-page bulletin outlines data on viscometer measuring elements. Instruments described are for operation under various pressure and explosion-proof conditions. Elements are said to be applicable for measuring viscosities from 0.1 to 1 million cp.

Bul No. V-1216 is issued by Norcross Corporation, Dept. CP, 247 Newtonville Ave., Newton 58, Mass. Specify 9439 opposite last page.



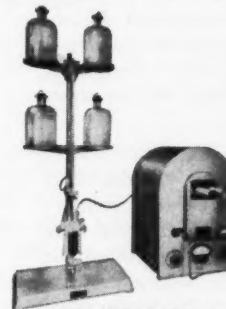
Control variations in levels from $\frac{1}{4}$ " upward. Remote control if desired — any distance. Controls unaffected by acids, caustics, pressures or temperatures.

Since 1933 B/W Controls have provided positive, dependable, economical liquid level control. No floats! No moving parts in liquid.

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Birmingham, Mich.

When inquiring check 9440 opposite last page



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NON-FERROUS METALS
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MINERALS
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ORGANIC CHEMICALS
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When inquiring check 9441 opposite last page

CHEMICAL PROCESSING

Monitors controller operation and sounds alarm on failure . . .

provides complete shutdown of process when abnormal condition arises

Uses: As monitor of control system using an on-off, two position control mode where input is of reasonably uniform duration. Monitor can be applied to processes involving heat, pressure, or flow.

Features: Process monitor provides safety shut-off and alarm without requiring added components for sensing elements. Instrument can be installed with only a slight change in wiring.

Description: Monitor operates as a direct function of signal received from automatic controller. Instrument continually monitors input to controlled process and

acts instantly to shut down operation when an abnormal condition arises. It can be wired to operate an external alarm circuit or to signal failure over telephone lines. Alarm will be actuated in event of failure during either "on" or "off" period of process, depending



Process monitor can be installed with only a slight change in wiring

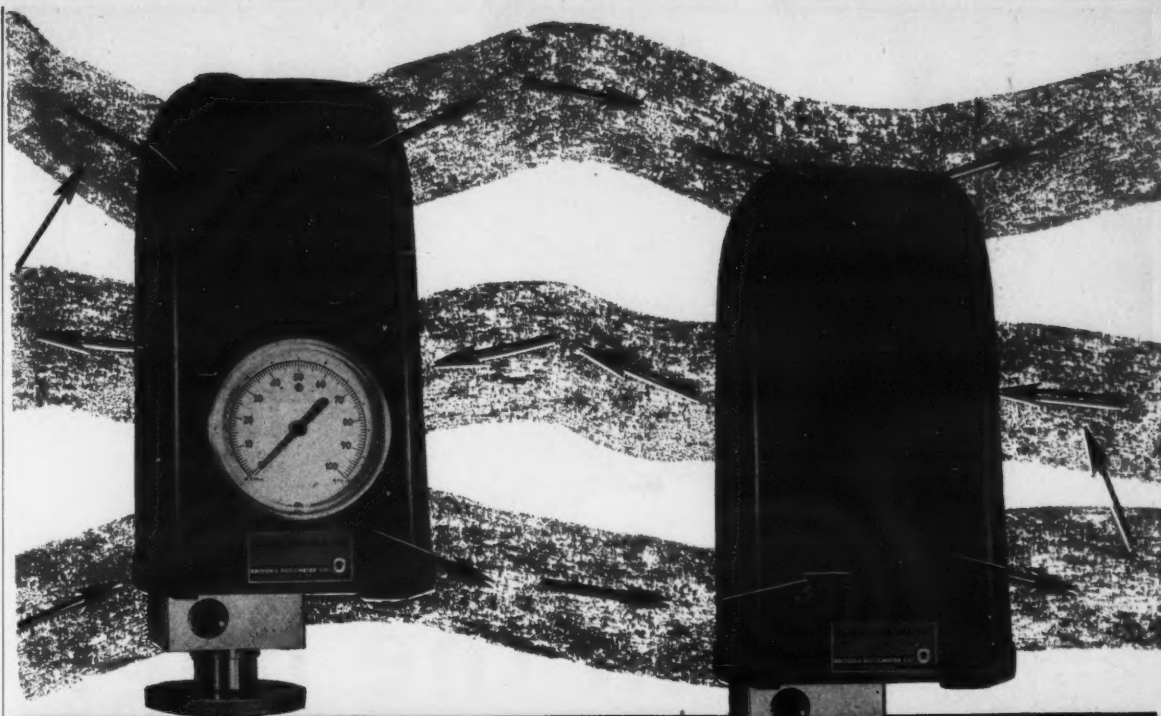
upon desired control. Toggle switch will allow bypassing of instrument during initial process operation, with erratic changes of process variables. Unit must be reset manually after each safety shutdown.

(Impulse Monitor is product of Damol Corporation, Dept. CP, 541 Land Title Building, Philadelphia 10, Pa. Check 9442 opposite last page.)

Instruments for analysis, control and data processing

Dynamic measurement, analysis, and control instruments are graphically presented in 32-page bulletin. Manufacturer's experience in development, production, and use of recording-measurement and analytical and control systems is reviewed. Photographs and drawings of equipment applications, and specification tables of many types of instruments are included.

Bul 1305 is issued by Consolidated Electrodynamics Corp., Dept. CP, 300 N. Sierra Madre Villa, Pasadena, Calif. When inquiring specify 9443 on form opposite last page.



A NEW IDEA in remote flow transmission are convertible . . . electric or pneumatic

Never before such flexibility . . . such performance. The new Brooks *TransiTWINS* are one basic flow transmitter design in two forms; fulfilling your present and future requirements. The Mag/Nu Matic is a force-balance pneumatic flow transmitter; the Elec Tru Matic is electrical. Now, you can switch one internal assembly to interchange electric or pneumatic units . . . for use with any existing receiver. The *TransiTWINS* are interchangeable with Mag Na Vue indicators, too, without change of float or float extension, without taking the meter from the line . . . in the biggest step ever taken toward standardized flow instrumentation.

To your technical sense, the high-resolution, transmission accuracy of the *TransiTWINS* will be an eye-opener.

To your practical sense, the maintenance simplicity of this rugged instrument line will be amazing.

If you *can* wait, send for Bulletin 170. If you *can't*, telephone your nearby Brooks representative.



Send for Bulletin 170.

Brooks TransiTWINS, Mag Na Vue, Elec Tru Matic, and Mag Na Vue are trademarks of The Brooks Company, Inc.

When inquiring check 9444 opposite last page



It's in the Bag!

Fresh, Clean Ink for a Year of Trouble-free Recording

★ You won't have any messy, time-consuming re-inking of pens on the new Bailey Recorders. The entire system is white-glove clean — hermetically sealed, non-evaporating, non-corrosive. Gone is any chance of sludge or oxide formation. Gone are clogged pens, interrupted records, unsightly splashes.

The transparent plastic ink sacs are changed once a year—that's all. Capillary tubing carries fresh, clean ink to the pens continuously without any day-to-day attention.

This exclusive new inking system* is only one of the many time-saving, money-saving distinctive features of the new Bailey Recorder.

Ask for Product Specification E12-5.

P34-1

*Now available for the New Bailey Recorder only.



ONLY BAILEY OFFERS ALL THESE ADVANTAGES IN A SINGLE RECORDER

- Pre-calibrated plug-in receiver units
- Up to four pneumatic or electronic receivers —or two receivers and two integrators
- Any four variables on one chart—easily read and interpreted
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- Faster ordering—from stock
- Minimum inventory of parts
- Minimum instrument investment for process cycle expansion or alteration

BAILEY

METER COMPANY

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CLEVELAND 10, OHIO

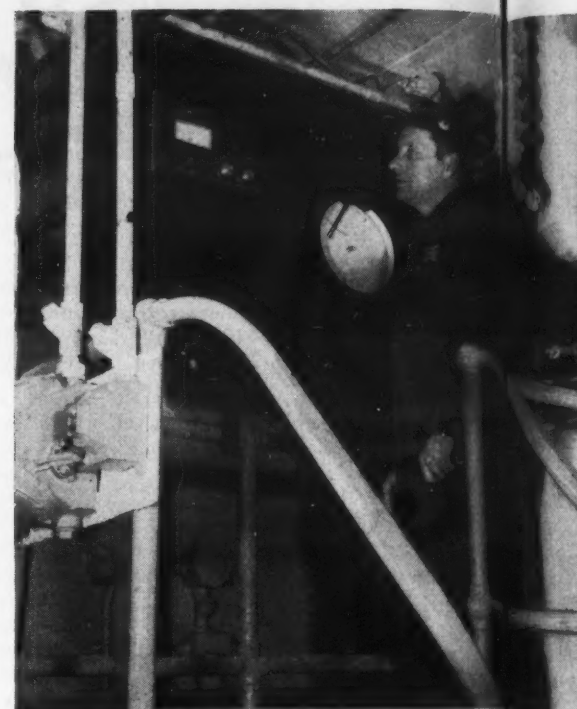
Controls for Power and Process



Controls for
TEMPERATURE
PRESSURE
GAS ANALYSIS
FLOW LEVEL
RATIO DENSITY

When inquiring check 9445 opposite last page

Instrumentation & control



automatic keeps Monsanto's

Meter speeds up process, allows continuous addition of alkaline material, and permits a record to be made of batches going through unit

GORDON WEYERMULLER
Associate Editor

Problem: Previously, grab samples were taken from a batch tank in service at Monsanto's Everett plant in order to adjust the alkalinity of the solution. Each sample was then checked with a portable instrument to determine pH. Alkaline addition had to be started and stopped with this procedure while tests were made.

Operation involving batch tank is one step in the manufacture of Santocel, a silica aerogel. Batch tank is filled with alcosols (salicylic acid suspension in alcohol in water). The pH of this mixture must be adjusted before using. Otherwise it would become a solid and couldn't be pumped when it is transferred to a 25'-long autoclave.

Solution: In Jan. 1956 a pH meter and pH elec-

CHEMICAL PROCESSING



CP Staff Photo

Operator checks pH of solution in tank

atic
to's

pH control Santocel pumpable

trodes were placed in service for automatically controlling the pH of the alcosol solution. Meter is compact due to use of miniature and sub-miniature tubes and printed circuits. It is unaffected by water, humidity, vibration, or electrostatic interference from motors. Electrodes can be mounted in immersion assemblies for tanks and in flow assemblies for pipe lines. A recorder is used with the pH meter at Monsanto, being mounted at the right of meter (See photo).

Results: Streamlining this step with automatic pH control assures uniformity of batches, helping to maintain the high quality of Monsanto's Santocel. This particular step is speeded up considerably. Alkaline material can now be added continuously, addition of material being stopped automatically when proper pH is reached. A record is now automatically made of pH and of each batch. No electrodes have failed from breakage or other causes.

(For more information on pH meter reader may simply check 9446 on the Reader Service slip which is located opposite last page.)

VIBRATION



Vibration of refinery compressor proves unshakable accuracy of RMC thermometer

The RMC Thermometer shown in the photograph is constantly subjected to extreme vibration from the two-stage Synthesis Gas Compressor on which it is installed. This powerful equipment is used to compress a mixture of H_2 and N_2 from 400 to 3500 pounds—at the Philadelphia Synthetic Ammonia Plant of The Atlantic Refining Company.

This particular job required a special thermometer that could withstand the constant and terrific vibration, and at the same time provide and maintain precise, accurate readings. Rochester Manufacturing Company promptly came up with the answer—a silicone-dampened, bimetallic, angle-form RMC thermometer. And this is but one example of how RMC engineering skill provides instruments that meet the most demanding and exacting requirements.

Look to RMC for Full-Line Instrumentation



DIAL THERMOMETERS

Illustrated here is a 6" dial thermometer with hermetically sealed dial chamber, external recalibration—built for heavy duty service. What are your thermometer requirements?

PRESSURE SWITCHES

This RMC Pressure Switch will stand heavy pulsating pressures, has close on-off differentials, maintains consistent cut-in, cut-out settings. What are your pressure switch problems?



TELL US YOUR REQUIREMENTS FOR DIRECT MOUNTING AND REMOTE INDICATING INSTRUMENTS, AND LET RMC ENGINEERING SKILL PROVIDE THE ANSWERS!

REPRESENTATIVES IN ALL PRINCIPAL CITIES



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"You Can Rely On Rochester"

LIQUID LEVEL, TEMPERATURE and PRESSURE INSTRUMENTS

ROCHESTER MANUFACTURING CO., INC.
86 ROCKWOOD STREET • ROCHESTER 10, N.Y.

When inquiring check 9447 opposite last page



How Capacitrols solved critical temperature control problem in transistor manufacture at RCA

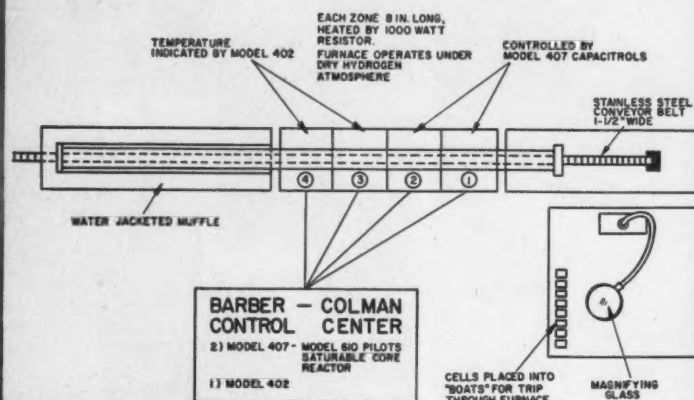


Diagram above shows smaller of two furnaces producing transistor cells. Two minute balls of indium are alloyed onto opposite sides of a .002 in. thick slice of germanium. Zones of germanium-indium alloy must grow inward toward central plane of germanium wafer to within .001 in. of each other. Conveyor belt carries cells through four furnace zones heated by resistors rated at 1000 watts per zone. Two Model 407 Capacitrols control temperature of zones 1 and 2. One Model 402 Capacitrol indicates temperatures in zones 3 and 4 by switching.

Photo at left shows workers preparing cells before Wheelco Control Center of larger, 12-zone furnace on which Model 407 Capacitrols similarly control and indicate temperature. Controlled temperatures are 610 to 550 C.

By applying accurate Wheelco 400 Series Capacitrols to two furnaces, RCA solved the key problem of process temperature control during crystal growth in its Harrison, New Jersey, transistor plant. The 400 Series Capacitrols are completely self-contained, direct-deflection-type indicating controllers with a wide range of application to jobs where temperature control is critical. 400 Series Capacitrols operate on the proved and accepted Wheelco "electronic control principle"—a precise control circuit constantly sensing changes in the measured variable. Simple design, careful workmanship, and quality materials insure long, trouble-free service. Write today for details of RCA's challenging problem and the simple solution found in Wheelco's 400 Series Capacitrols.

WHEELCO INSTRUMENTS DIVISION

Barber-Colman Company

DEPT. L, 1520 ROCK STREET, ROCKFORD, ILLINOIS

Industrial Instruments • Automatic Controls • Air Distribution Products
Aircraft Controls • Small Motors • Overdoors and Operators • Molded Products • Metal Cutting Tools • Machine Tools • Textile Machinery

When inquiring check 9448 opposite last page

INSTRUMENTATION

Gives fast positioning with low consumption of air...

reduces need to increase compressed air capacity

Uses: As pilot positioner for rubber diaphragm-operated valves.

Features: Pilot positioner operates with low air consumption, using only an amount equal to that required by a room thermostat.

Description: Pilot positioner is designed for repositioning even for very small changes in air pressure from controlling instrument. Unit is designed so that maximum power is available at



Pilot positioner will reposition even for very small changes in air pressure

all times for repositioning. Supply air at 15 to 20 psi is connected to positioner with a direct relay transmitting changes in pilot pressure. Low air consumption reduces need to increase compressed air capacity with addition of more pilot positioners to system.

Operating range of positioner is adjustable from 3 to 16 psi. Starting point of range is adjustable from 0 to 20 psi. Unit has been designed for use on valves having 4-R, 5-R, or 8-R tops. Various pilot springs are available for positioner to use with different valve lifts.

(Precision Pilot Positioner is product of Johnson Service Company, Dept. CP, 509 E. Michigan Street, Milwaukee 1, Wisconsin... or for more information reader may simply check 9449 on the Reader Service slip located opposite last page.)

King MANOMETERS

Every Size — for Every Service

U-Type Manometers

- Single Cleanout
- Single Gland-Packed
- Double Cleanout
- Double Gland-Packed
- High Pressure

Low in price
Trouble-free
Easy to install
and read

Well-Type Manometers

- Low Well
- Raised Well
- Barometric Reading

Stay clean
longer
Easy to service

Multi-Tube Manometers

- Multi-Well
- Common-Well
- Special-Purpose

FREE LITERATURE gives sizes, construction and prices. Write today! And ask for informative 12-page Manual on Manometers.

KING ENGINEERING PRODUCTS include King-Gages — Manometers — Self-Closing Push Valves — Pressure Transmitters — Sight Feed Bubblers — Overflow Check Valves — Air-flow Snubbers — Sediment Traps — Moisture Indicators



KING ENGINEERING CORP.

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REPRESENTATIVES IN PRINCIPAL CITIES

When inquiring check 9450 opposite last page

New Compact conax[®] TERMINAL HEAD with

- Light weight design
- Simple assembly
- Watertight construction
- Bright chrome finish
- Corrosion resistance

for

use with 30 gage to 14 gage wire — maximum operating temperature of +300°F. (continuous) or +450°F. (intermittent). Ideal with Conax Thermocouple Glands, Conax Speedwells, Conax Flex-tube Assemblies, Conax Safetywells and other similar applications.



WRITE FOR CONAX DATA BOOK SHOWING COMPLETE LINE OF THERMOCOUPLE ASSEMBLIES AND PRESSURE SEALING GLANDS.

conax corporation

7817 sheridan drive, buffalo 21, n. y.

When inquiring check 9451 opposite last page

CHEMICAL PROCESSING

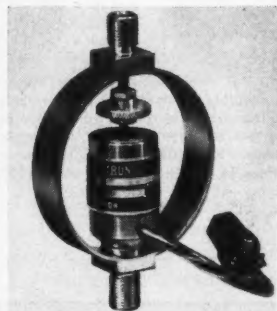
Keeps calibration — won't fatigue

Proving ring force transducer measures static or dynamic forces for recording or control

Uses: As measuring element in determining static or dynamic forces, either tension or compression, for measurement of force, weight, or stress in tank weighing, torque, filling control, and other process control operations.

Features: Proving ring force transducers are not subject to aging or fatigue effects so calibration can remain constant even over years of constant operation.

Description: Transducer provides an electrical output voltage that is proportional to applied force. Essentially, unit consists of a primary and two secondary windings positioned on a hollow non-magnetic cylinder with a small iron core moving axially within the cylinder. When the primary is energized with alternating current, voltages are induced in two secondary windings. If the iron core is in the



Transducer combines proving ring and differential transformer for measuring weight or stress

exact center, or neutral position, two secondary voltages will be equal due to symmetry of their coupling to the primary and will cancel. If the iron core is not in the exact center, motion away from neutral can be determined by comparing output signal with primary excitation. Comparison can be accomplished automatically with instruments designed for the purpose.

Since method of operation does not involve rubbing or flexing parts, instrument is not subject to aging or other effects even under extended, continuous operation. Unit is also relatively unaffected by shock or humidity.

Eleven models cover ranges from ± 10 to 100,000 lb with linearity of 0.5%. Excitation frequency can be 60 to 10,000 cp. Excitation voltage is 6.3 volts. Safe load capacity is 150% to avoid calibration change, 200% to avoid failure. Repeatability is 0.1%. Mechanical zero adjustment is provided to null tare loads.

(Series 140 Force Transducers are product of Daytronic Corporation, Dept. CP, 216 South Main St., Dayton 2, Ohio . . . or for more information check 9452 on form opposite last page.)

Bubbles capture more copper with Beckman pH control

Close control of pH is essential in the recovery of copper from crude ore. As crushed ore enters ball mills for wet grinding, a lime slurry is added so the mixture will go into the flotation process at a relatively high pH. Air pressure then whips up a froth and bubbles capture the finely-ground copper particles, ride them to the surface and float them out of the flotation cells.

Automatic pH control helps provide uniform operating conditions in the flotation machine. Result: better flotation



Beckman pH meter is heart of automatic control system.

job and less copper in the tailing. The saving of one one-hundredth of one per cent of copper from the tailing can mean the difference between profit and loss in a large mill.

At the Copper Cities Mine in Miami, Arizona, where 12,000 tons of ore are processed daily, engineers called on Beckman pH instrumentation to control automatic addition of lime slurry to the copper ore. With the advantages of automatic pH control established, Copper Cities is planning similar installations for its seven grinding circuits.

The mining industry, as well as many other industries, is steadily swinging away from "grab sampling" techniques toward the lower costs, increased efficiency and higher product quality offered by automatic pH control. Mail the coupon today for information on how Beckman pH control can help your process.

Beckman Instruments, Inc., Process Instruments Dept.,
Fullerton, California N-30-11

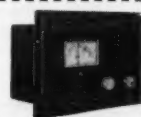
- ☐ Please send me a pH System Analysis Form that will entitle me to a free engineering analysis and recommendation for solving pH problems at our plant.
- ☐ Please send me a copy of "Industrial pH Measurement and Control" and add my name to your mailing list to receive additional information on pH control.

Name: _____ Title: _____

Firm: _____

Street: _____

City: _____ Zone: _____ State: _____



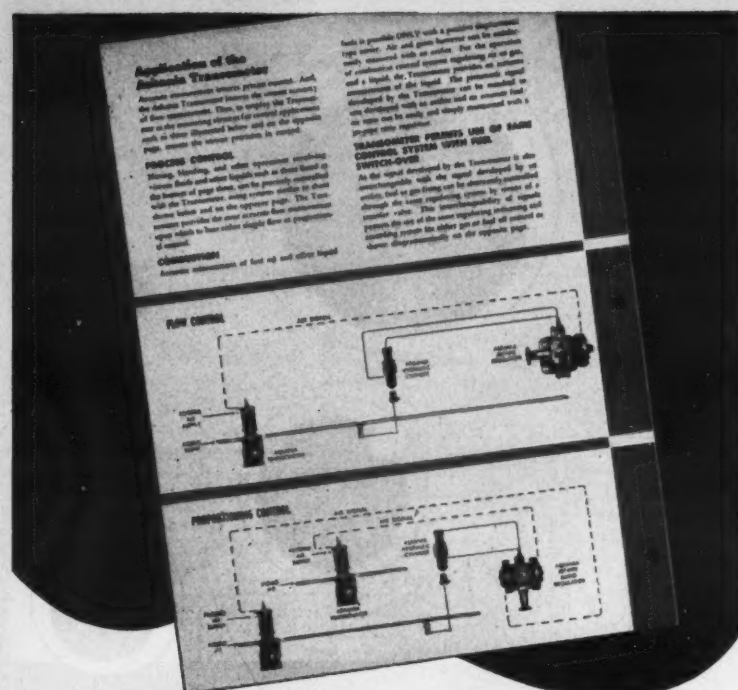
Beckman® / process instruments

Our continued growth creates openings for creative engineers. Write for career file #10.

When inquiring check 9453 opposite last page



Beckman pH electrode assembly being immersed in copper ore froth.



NEW BULLETIN SHOWS HOW TO METER, INTEGRATE AND CONTROL WITH THE ASKANIA TRANSOMETER

Describes Flow, Indication, Recording and Control Applications For Fuel Oil, Viscous and Other Liquids

A new illustrated booklet is now available to men interested in technical information on the Askania Transometer which:

1. is an unusually accurate flow meter
 2. integrates the flow of viscous liquids and other liquids (including fuel oil)
 3. develops a pneumatic signal for recording and control purposes.
- Bulletin #301 includes a listing showing typical liquids that can be measured by the Askania Transometer. It illustrates: how the liquids are metered and integrated how the signals for the recording and control are developed.

APPLICATION DRAWINGS

Of particular interest are the operational diagrams and descriptive information showing: flow, proportioning and combustion controls totalization of multiple fuels interchangeable control for fuel switch over hook-ups.

These show at a glance just how: the liquid is metered, the air signal is dispatched to the Jet-Pipe Regulator

the regulator actuates the hydraulic cylinder for the control valve.

Ranges and specifications by connecting pipe sizes, flow range, operating pressure and maximum operating temperature limit are provided.

DESIGN FEATURES

An additional feature of the new bulletin is the added information and specifications on Askania's simple, economical constant flow valve which can be used to economically maintain a constant flow.

For your copy of the Askania Transometer Bulletin—fill in the enclosed coupon and mail, or write to Askania Regulator Company, 242 E. Ontario, Chicago, Illinois

Yes, send me a copy of bulletin #301

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TITLE _____
COMPANY _____
ADDRESS _____

ASKANIA REGULATOR COMPANY

"CONTROLS FOR INDUSTRY"

HYDRAULIC, ELECTRONIC CONTROLS & SERVOS, GENERAL SYSTEMS, ENGINEERING & COMPUTER SERVICE, VALVE ACTUATORS & CYLINDERS

A Subsidiary of General Precision Equipment Corporation

When inquiring check 9454 opposite last page

INSTRUMENTATION

Uses cantilever design for tubing support . . .

requires only "wrist-twist" for installation

Uses: For supporting manufacturer's metal trough for instrument tubing.

Features: Cantilever-designed tubing support arm allows tubing to be lifted over side of trough without interference from uprights supporting arm itself.



Allows tubing to be lifted without interference

Description: Support of cantilever design was developed for manufacturer's system of instrument tubing troughs. Supports can be installed with a "wrist-twist" to secure arms to upright channel irons with pre-punched holes.

(RAKIT supports are product of Instrof Corp., Div. of T. J. Cope, Inc., Dept. CP, Collegeville, Pa. Check 9455 opposite last page.)

Has psychrometric chart and humidity tables

Two-color bulletin of 22 pages which illustrates and describes company's complete line of humidity recording and controlling instruments includes psychrometric chart and relative humidity tables. Accessories are also described.

Bul H1009 is issued by The Bristol Company, Dept. CP, Waterbury 20, Conn. Specify 9456 opposite last page.

SIMPLYTROL AUTOMATIC PYROMETERS For Control of Temperature

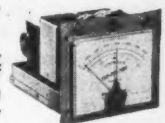


10 standard ranges from -200° to +3000° F. Accuracy 2% (limit of calibration error). Sensitivity 4 ohms per millivolt.

Cat. No. 4535, size 10" x 6" x 7". Range 0/1000° F, 0/500°C. \$135.00

Thermocouple-type automatic pyrometer for controlling temperature in furnaces or ovens and manufacturing processes. Leads between Simplytrol and its thermocouple sensing element may be up to 100 feet or more depending on temperature range and lead wire resistance. Load relay, 5 amperes S.P.D.T. Optional heavy duty relays to 40 A.

Either AUTOMATIC control or LIMIT shutoff. An automatic Simplytrol turns heat on and off to hold required temperature. Proportioning effect can be increased or decreased by changing cam on the sensing cycle. With shorter cycles, control more nearly approaches straight line. A limit Simplytrol locks up when the trip point is reached and remains locked until reset. Use limit Simplytrols for monitoring and safety shutoff or alarm.



Cat. No. 4532-MFP, size 5" x 5 1/2" x 8" deep. Range 0/1500° F, 0/800°C. \$127.00

Cabinet model for wall mounting or portable shown at top. To the right is an MFP Simplytrol for flush mounting in a cabinet or control panel. Several other mountings are shown in Catalog 4-A. Send for your copy. Assembly Products, Inc., Chesterland 36, Ohio. Phone (Cleveland, O.) Hamilton 3-4436. (West Coast: Desert Hot Springs 36, Cal. Phone 4-3133 or 4-2453).

When inquiring check 9457 opposite last page

made to measure

Every item in the Diamond D Blue Line will measure with maximum accuracy and uniformity. The graduations are calibrated with extreme care and the etching is deep and clear to afford maximum readability.

The pigment in the Diamond D Blue Line is heat-fused into the graduations and is impervious to practically every chemical.

The Diamond D Blue Line is annealed in electrically-controlled lehrs to relieve internal strain and each piece is double tested to rigid standards. When you need laboratory glassware with built-in accuracy and uniformity, specify the Diamond D Blue Line.

Send for FREE brochure today.

DOERR GLASS COMPANY
VINELAND, N. J.

When inquiring check 9458 opposite last page

CHEMICAL PROCESSING

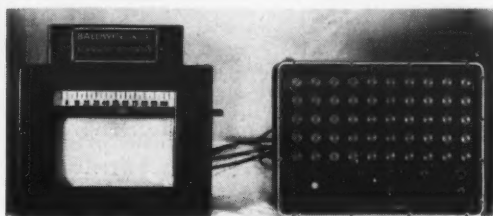
**Automatically plots weight
or stress-strain curves
during process . . .**

gives immediate information as to trend
from up to 50 strain gage test points

Uses: As automatic scanning recorder for
SR-4 strain gages covering up to 50 points.

Features: Automatic scanning recorder gives
immediate information as to trend.

Description: Recorder consists of three units
— recorder, control cabinet, and switching and



Each scale or 50-point recorder can be individually
adjusted

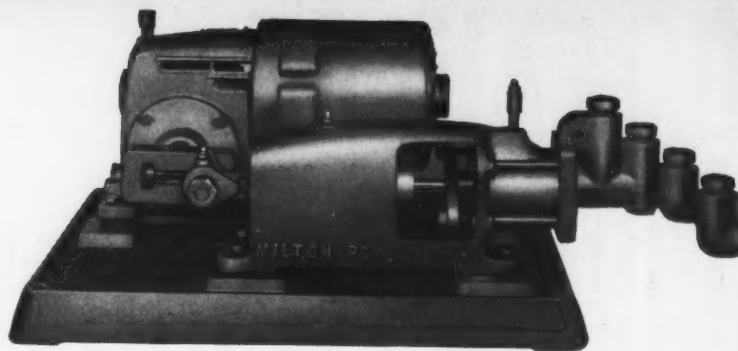
balancing unit. Either two-arm or four-arm strain
gage bridges can be accommodated by recorder
by positioning a selector switch. Individual curves
can be plotted for each channel by an automatic
advance of chart in increments of four inches for
any given percentage of ordinate reading. Stress-
strain curves are plotted on scales of 0-100 for
strain and 0-100% for load. After each sequence
of readings, chart is advanced manually by a pro-
portional amount of full load on stress axis. Com-
pletion of sequence of 50 readings requires 30 to
90 seconds. Instrument has manual adjusting
knobs for gages with resistances ranging from 60
to 500 ohms, and gage factors between 1.77 and
2.25.

(50-point recorder is product of Electronics and
Instrumentation Division, Baldwin-Lima-Hamilton
Corporation, Dept. CP, 806 Massachusetts Ave.,
Cambridge 39, Mass. . . . or for more information
check 9459 on form opposite last page.)

CP is "different" . . .

. . . in style—how an article is written.
It's tailored for rapid, informative reading
by the busy processing man.

see page 171



Standard Milton Roy Motor-Driven Controlled Volume Pump.

Want to make your chemical metering more profitable?

**Your operating and maintenance costs are lowest
when you use Milton Roy Controlled Volume Pumps
for metering process additives**

Accuracy of \pm one percent increases end-product uniformity and
reduces waste of metered chemicals. The result . . . lower production
costs, more profitable operation.

Design and construction dependability provide long service life with
minimum maintenance. The result . . . lower production costs, more
profitable operation.

Milton Roy Controlled Volume Pumps serve equally well as flow con-
trollers, ratio controllers, or final control elements . . . are available in
simplex, duplex, and multiple liquid end types.

Whatever your chemical metering problem or requirement, a Milton Roy
Controlled Volume Pump or Chemical Feed System will provide a
trouble-free, economical solution. Capacities range from 3 milliliters per
hour to 45 gpm . . . at pressures to 50,000 psi.

Write today for any of these bulletins:

"Controlled Volume Pumps in Process Instrumentation," Bulletin 1253.

"Controlled Volume Pumps in Industrial Water Treating," Bulletin 953.

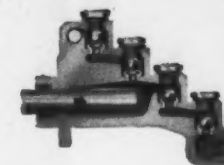
"Controlled Volume Pumps in Paper Making," Bulletin 455.

Milton Roy Company
Manufacturing Engineers
1300 E. Mermaid Lane
Philadelphia 18, Pa.

Engineering Representatives in
the United States, Canada,
Mexico, Europe, Asia,
South America and Africa



Exclusive Milton Roy
STEP-VALVE LIQUID END



Double ball checks, sloping
passages and absence of
air pockets assure highest
possible volumetric effi-
ciency. Should a solid par-
ticle lodge under one suc-
tion ball, for example,
second suction ball will seat
on discharge stroke, there-
by preventing fluid from
being pumped into suction
piping.

When inquiring check 9460 opposite last page

NO LEAKAGE NO CONTAMINATION NO STUFFING BOX



Lapp PULSAFEEDER CONTROLLED-VOLUME CHEMICAL PUMP

Lapp Pulsafeeder is a combination piston-diaphragm pump for controlled-volume pumping of fluids. Reciprocating piston action provides positive displacement. But the piston pumps only a hydraulic medium, working against a diaphragm. A floating, balanced partition, the diaphragm isolates chemical being pumped from the working pump parts—eliminates need for stuffing box or running seal. Pumping speed is constant; variable flow results from variation in piston-stroke length—controlled manually by hand-wheel, or, in Auto-Pneumatic models, by instrument air pressure responding to any instrument-measurable processing variable.

WRITE FOR BULLETIN 440 with typical applications, flow charts, description and specifications of models of various capacities and constructions. *Inquiry Data Sheet* included from which we can make specific engineering recommendation for your processing requirement. Write Lapp Insulator Co., Inc., Process Equipment Div., 667 Wilson St., Le Roy, N. Y.

Lapp

When inquiring check 9461 opposite last page

INSTRUMENTATION & CONTROL

Institute adopts standard terms

A 12-page booklet containing the standard classification and terminology for power actuated valves provides a practical framework of standard terms for everyday use of operating engineers, instrument engineers and mechanics. It is expected to clear up existing ambiguities and uncertainties, and provide a broad base for new and accepted names and terms which should be recognized and preserved.

"Standard Classification and Terminology for Power Actuated Valves" is published by Fluid Controls Institute, Dept. CP, Box 191, Decatur, Ill. Specify 9462 on form opposite last page.

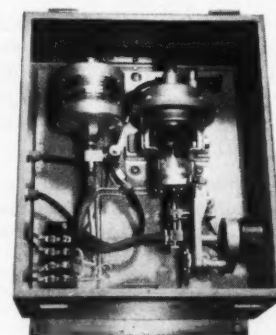
Records, indicates, or totalizes while proportionating feed to flow fluid . . .

electro-pneumatic proportioning and metering system provides overall accuracy of $\pm 2\%$

Uses: Maintaining chemical feed in proportion to flow, and recording, indicating, and totalizing of flow on a linear scale.

Features: Proportioning and metering system requires no electrical connections in Venturi pit or pipe gallery and allows transmitter to be installed up to 500 feet from differential producer.

Description: Proportioning and metering system consists of Venturi tube or orifice plate, rate of flow converter, pressure regulators, transmitter, and feeder unit. Flow through Venturi or orifice plate creates a differential pressure proportional to square of the flow. Converter receives this differential across a diaphragm mechanically linked to an air control valve. Linkage is also connected to a spring-loaded float immersed in mercury. Differential across diaphragm opens air control valve and causes mercury level to be lowered, establishing a controlled air pressure. Shape of float converts square root flow function to a corresponding linear function. Controlled air pressure from the converter is therefore directly proportional to flow rate.



Transmitter of proportioning system. Air-operated electric switch is at left. Diaphragm and air control valve is at right

Controlled air pressure is then converted by transmitter to electrical impulses to proportion chemical feeders and to actuate meters.

System is designed to provide an overall accuracy of $\pm 2\%$ over range of flow from 100% to 10% of rated capacity.

(ATI proportioning and metering system is product of Infilco, Inc., Dept. CP, Tucson, Arizona . . . or for more information check 9463 on form opposite last page.)

Gas chromatography instrument is discussed

Features and specifications of economical gas chromatography apparatus for analysis of gases and liquids boiling up to 300°C are covered in 16-page brochure. Examples are given of trace analyses possible with apparatus. Instrument's use in conjunction with infrared spectroscopy is discussed. A selective table showing what liquid partition and solid adsorption columns should be used for routine light gas separation is included.

"Vapor Fractometer" is issued by Instrument Division, Perkin-Elmer Corp., Dept. CP, Norwalk, Conn. When inquiring specify 9464 on form opposite last page.



"Well, how are the resiliency tests coming?"

RIGHT on all counts!

- **inherently right**, because of Weston's exclusive design and advanced manufacturing techniques
- **easy-to-read right**, because they read with on-the-button accuracy, at a glance
- **and right** for budget reasons, because they give trouble-free service for years — bring thermometer costs 'way down

Weston bimetal thermometers are available in types, sizes and ranges for industrial as well as laboratory needs. Bulletin T13 gladly sent on request. Weston Electrical Instrument Corporation, Newark 5, New Jersey.

WESTON

Bimetal

THERMOMETERS

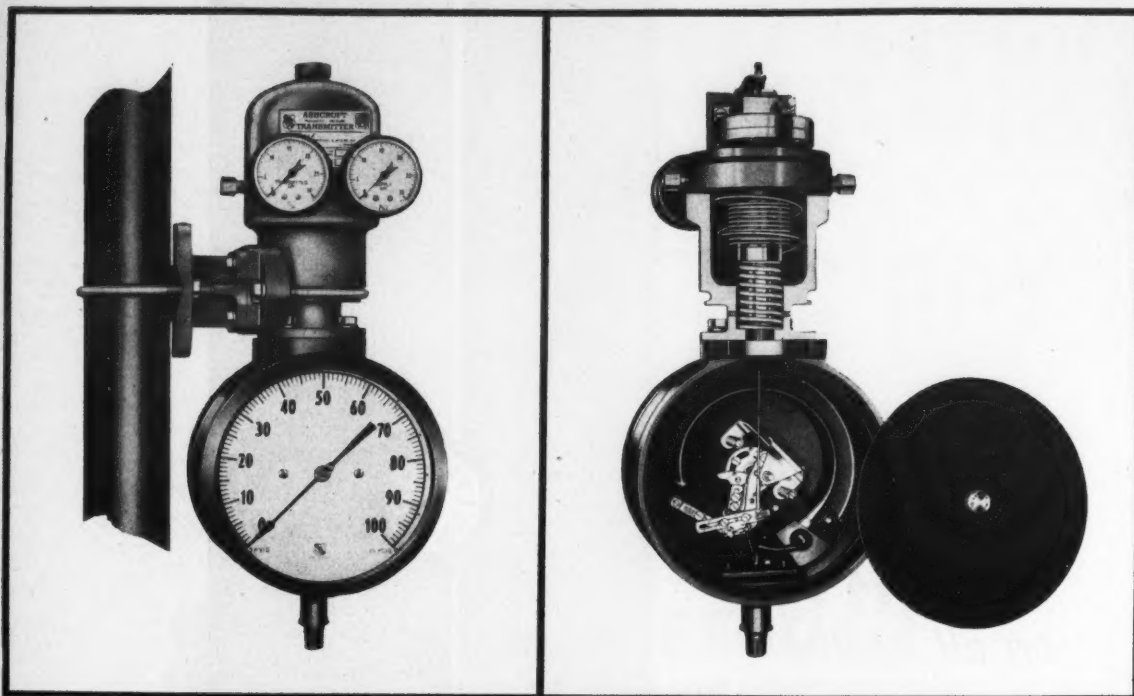


When inquiring check 9465 opposite last page



Designed to solve safety and service problems

...THE NEW ASHCROFT PNEUMATIC PRESSURE TRANSMITTER



This new Ashcroft Pneumatic Pressure Transmitter is particularly recommended to processing industries and power stations. It combines speed and accuracy with maximum protection and serviceability.

The new design features the 6" indicating Ashcroft Maxi-safe Duragauge, long known for dependable performance. It has an integrally-cast solid metal wall between dial and pressure sensitive element so that the transmitter can measure pressures up to 100,000 psi with complete safety for personnel and equipment. If misapplication ruptures the Bourdon tube, the Teflon-coated back cover serves as a safety blowout relief.

Another outstanding design advantage is easy access to both gauge and transmitter sections. Simply remove the safety-relief back cover and both the gauge and transmit-

ter can be calibrated. Yet a sealed housing makes the entire assembly weatherproof.

The transmitter operates on low-pressure air. No need for expensive high-pressure lines and fittings. Supply air pressure as low as 18-20 psi for 3 to 15 psi output provides especially advantageous operation where electrical wiring might be a hazard. Inflammable, poisonous or corrosive liquids or gases are confined close to their source, away from the central control point.

The Series 1250 Ashcroft Pneumatic Pressure Transmitter is available with pressure sensing elements in all standard pressure ranges and Bourdon tube materials. Installation of the transmitter is easy. Small diameter tubing may be used, and the pipe, stem, wall or flush mounts are interchangeable in the field. Get complete operational data and construction details. Write for Bulletin 340.

YOUR INDUSTRIAL SUPPLY DISTRIBUTOR has the broad knowledge and thorough experience essential to satisfy every requirement of your Ashcroft Pneumatic Pressure Transmitter application. You get fast, economical service from his local stocks.

In Canada: Manning, Maxwell & Moore of Canada, Ltd., Galt, Ontario

ASHCROFT GAUGES

A product of **MANNING, MAXWELL & MOORE, INC.** STRATFORD, CONNECTICUT

MAKERS OF 'AMERICAN' INDUSTRIAL INSTRUMENTS, 'ASHCROFT' GAUGES, 'CONSOLIDATED' SAFETY AND RELIEF VALVES, 'AMERICAN-MICROSEN' INDUSTRIAL ELECTRONIC INSTRUMENTS, Stratford, Conn. 'HANCOCK' VALVES, Watertown, Mass. 'CONSOLIDATED' SAFETY RELIEF VALVES, Tulsa, Oklahoma. AIRCRAFT CONTROL PRODUCTS, Danbury & Stratford, Conn. and Ingelwood, Calif. "SHAW-BOX" AND "LOAD LIFTER" CRANES, "BUDDIT" AND "LOAD LIFTER" HOISTS AND OTHER LIFTING SPECIALTIES, Muskegon, Mich.

When inquiring check 9466 opposite last page

INSTRUMENTATION & CONTROL

Shows analog-to-digital conversion with angular position encoders

Compact 13-digit and 16-digit optical encoders are described and illustrated in eight-page bulletin. Operation of the encoders, which generate binary-parallel code signals representing angular shaft position, is explained, and performance features are pointed out. Construction details and specifications are included.

Bul 0156 is issued by Electronics Division, The Baldwin Piano Company, Dept. CP, 1801 Gilbert Ave., Cincinnati 2, Ohio. When inquiring specify 9467 on form opposite last page.

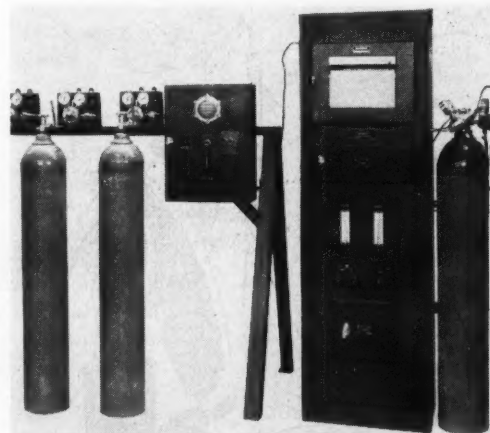
Automatically samples quality or purity of compressed gases in standard cylinders . . .

operation is fast enough that large number of cylinders can be checked 100%

Uses: As automatic gas sampling system for checking a large number of cylinders before use in process operations.

Features: Automatic cylinder sampling system is fast enough that every cylinder can be checked 100% for purity or quality before using.

Description: Sampling station will check five compressed gas cylinders to 0.01% argon purity. white, red, and green lights indicate purity of



Analyzes five cylinders to 0.01% argon purity automatically in eight minutes

cylinders. White indicates start of checking, red means rejection, and green shows acceptance. Cylinders can be removed after analysis to allow continuous operation of the sampling station.

Five cylinders can be checked for purity of 99.99% in approximately eight minutes. System then turns itself off and no longer takes gas from

INSTRUMENTATION & CONTROL

the cylinders. Although developed for argon purity analysis, system can be adapted for checking other gases where there are suitable instruments.

(Automatic gas analyzer is product of Thermo Laboratories, Dept. CP, Michigan City, Indiana . . . or check 9468 on form opposite last page.)

Is small dual-purpose indicator for testing potentiometers and thermocouples . . .

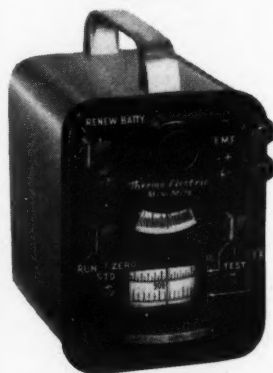
weighs only four pounds and is very compact, yet has a scale 23½ inches long

Uses: As portable indicator for testing potentiometers and measuring temperatures in conjunction with a thermocouple.

Features: Dual-purpose indicator requires only negligible maintenance—voltage is supplied by an easily replaced mercury cell battery. Complete instrument weighs under four pounds.

Description: Portable potentiometer indicator has standard double-scale range of 0 to 1800°F

for iron-constantan and 0 to 2400°F for chromel-alumel. Other scale ranges are also available. Major graduations are in 100°F for both calibrations while minor graduations are in 5°F for I-C and 10°F for C-A. Accuracy is ¼ of 1% of scale range. Unbreakable dial window has hairline sight for accurate reading. Scale is 23½ inches long.

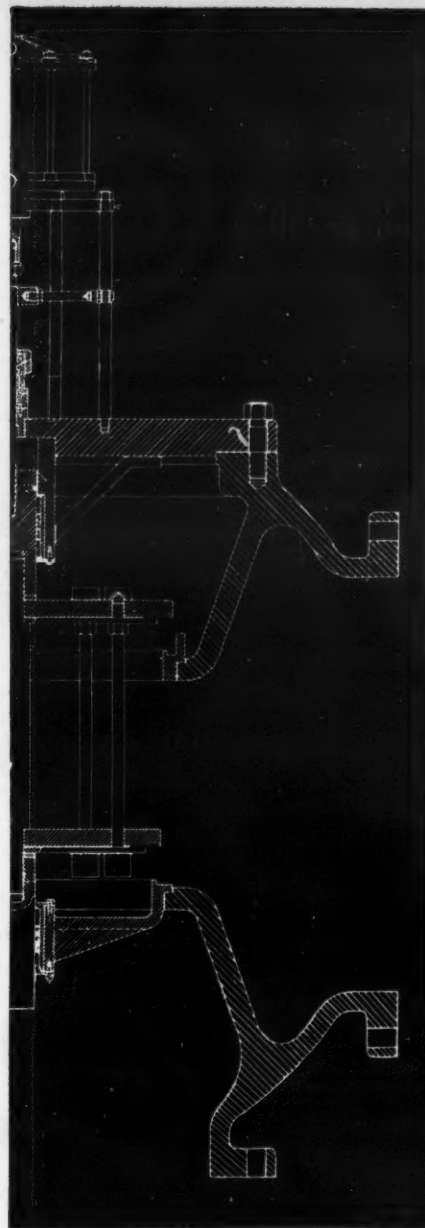


Indicator weighs only four lb

Dual-purpose indicator can be used to measure temperature directly, when connected to a thermocouple, and also as standard comparison instrument for checking potentiometers. Thermocouple circuit resistance may be any value within reasonable limits without affecting calibration of indicator. When instrument is used to check potentiometers, cold-junction compensation may be switched off and no auxiliary voltage source is necessary. Temperature is read directly in degrees. No conversion from millivolts is necessary.

Indicator is 4x5x6". Case is enamel-finished corrosion-resistant aluminum.

("MiniMite" is product of Thermo Electric Company, Inc., Dept. CP, Saddle Brook, New Jersey . . . or check 9469 on form opposite last page.)



ABOVE: Partial cross-section of K&M 36-inch valve showing general construction.

AT RIGHT: Actual size of a 36 inch valve can be visualized from this illustration of a workman inside the valve body performing finishing operations.

largest double-seated control valve ever made

When you are talking big control valves, talk to Kieley & Mueller. K&M is the largest manufacturer of the big ones, control valves above 16 inches. Standard globe-type valves are available in 20, 24, 30 and 36 inch sizes; even larger valves will be produced on special order.

This 36-inch double-seated angle valve closes snugly on giant Teflon seats. The inner valve positions responsively, gliding on special roller-slide bearings. It's massive, but it operates protected by a K&M patented torque resistor. Beyond the problem of size, this valve is mounted on its side, and it has been performing creditably for over four years.

BIG or small, if it's control valves, you'll like the pitch-in, helpful approach of your local K&M representative . . . plus capable engineering and manufacturing follow-thru at the K&M plant.

Write for Bulletin CV-53.



KIELEY & MUELLER, INC.

64 Genung Street • Middletown, New York

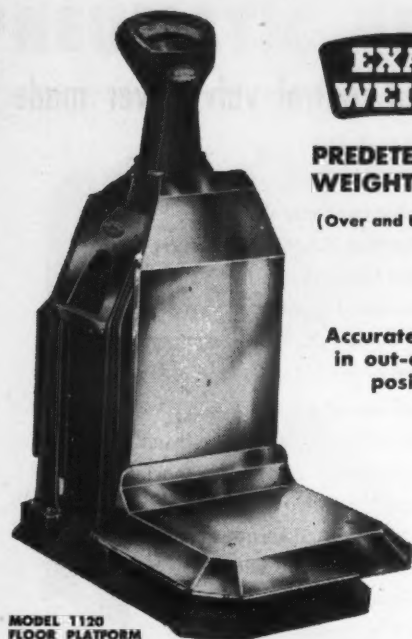
78th Anniversary . . . Oldest U.S. Pressure and Level Control Valve Manufacturer

K&M

When inquiring check 9470 opposite last page

Fast, Dependable Accuracy

FOR YOUR WEIGHING OPERATIONS—



MODEL 1120
FLOOR PLATFORM

**EXACT
WEIGHT**

**PREDETERMINED
WEIGHT SCALES**

(Over and Under Type)

Accurate weight
in out-of-level
position

FOR CHECKWEIGHING BAGS —

Short lever fall with adjustable hydraulic damping mechanism assures speed and accuracy. Easy-to-read dial on tilted tower. Dial indication provides 2 inches of travel, equivalent to 16 ounces over and under. Model shown above is 100-lb. capacity; others available to meet any requirements.



FOR PRODUCTION OPERATIONS

MODEL 213

Dial and platters positioned in direct range of operator's vision for uninterrupted flow of production. Magnified fractional ounce indication. Available in straight tower or slant tower. Capacity: 3 lbs.

Sales and Service Coast to Coast

Exact Weight

Better quality control

Better cost control

Scales

THE EXACT WEIGHT SCALE COMPANY

905 W. Fifth Avenue, Columbus 8, Ohio
In Canada: P. O. Box 179, Station 5, Toronto 18, Ont.

When inquiring check 9471 opposite last page

packaging & shipping



Until now, fluorine has been transported only as a gas under pressure. Now, General Chemical Division of Allied has developed system to . . .

transport liquid fluorine in giant 'thermos bottle'

Fluorine, the most reactive element has, up to now, been transported only as a gas under pressure. This has meant shipment of very small quantities in large cylinders, making its use impractical for almost all production requirements. In most instances, industrial processing involving fluorine has been designed to obtain the element from hydrofluoric acid or some other fluorine-containing chemical.

System recently put into use transports tonnage quantities of liquid fluorine in bulk containers. Using unique triple-tank containers, system will enable users to design processes which use fluorine directly without intermediate steps.

Container can be compared to a "giant thermos bottle" which consists essentially of three horizontal tanks, one inside the other with the spaces between

serving as insulation media. Fluorine in inner tank is kept in liquid state by a layer of liquid nitrogen in the second which cools the material to below its boiling point.

Space between the second and third tanks serves as an insulating shield for the nitrogen.

Tank system is designed to be used as stationary storage or as a bulk shipping container when mounted on a trailer transport chassis. Latter use has been issued a special permit by the Interstate Commerce Commission.

Transports "could be delayed for several weeks during hot weather in a desert without replacing the nitrogen," the manufacturer states.

Transports are expected to be used by consumers



Fluorine transports can be used by consumers as "storage on wheels"

as "storage on wheels," with only a simple exchange of carrier being required when one is emptied. This will eliminate complicated manifold and associated valves, gaskets, and other equipment needed for cylinder handling.

(Liquid Fluorine is produced and shipped by General Chemical Division, Allied Chemical and Dye Corp., Dept. CP, 40 Rector Street, New York 6, New York . . . or for more information reader may simply check 9472 on the Reader Service slip which is located opposite last page.)

(Fluorine tanks were constructed by Air Products, Inc., Dept. CP, Allentown, Pa. . . . or for more information check 9473 on form opposite last page.)

CP's "different" format . . .

. . . helps you easily find and quickly grasp information which interests you. Sectionalization and large well-planned layouts are important. Read why . . .

. . . on page 171

Continental's FIBRE DRUMS



RIGIDLY INSPECTED FROM TIMBERLAND TO FINISHED DRUM

At Continental we have complete control over every step in the process of making fibre drums. We have our own timberlands, paper mills, and fibre drum plants and follow rigid inspection procedures. That's why Continental fibre drums are unsurpassed for rugged durability and give extra protection to your product in shipping and storage.

Neat, trim Continental fibre drums are tailored to fit your product and expertly printed or spray painted. Their light tare weight will save you money on shipping expenses, too.

Check the advantages of Continental's fibre containers—Leverpak, Stapak, or Fiberpak—and discover how they can help increase your profits. Call us today.

CONTINENTAL © CAN COMPANY

FIBRE DRUM DIVISION • VAN WERT, OHIO

New York • Philadelphia • Pittsburgh • Tonawanda • Cleveland • Chicago • Atlanta • St. Louis • San Francisco • Los Angeles • Eau Claire • Boston



When inquiring check 9474 opposite last page

Ouija boards are passé



Time was, when a person had a question, out would come the ouija board for an answer. This wasn't too accurate a system, of course... but a lot of people put a lot of faith in what the ouija board told them.

Times change — and today accuracy is the keyword. That's why the modern business publication wants its circulation audited.

In joining BPA* the publisher is taking an important step toward sound and accurate planning in your behalf. It means that he is checking, double-checking and constantly rechecking —

- Who you are
- Where you work
- What your job is

He wants and needs this information — and the BPA* audit can assure both him and his advertisers that he is getting his magazine into the hands of people *qualified by their common interests* to receive it. It helps him to give you —

- Editorials that will help you in your work
- Advertising that will have value to you

He can serve you even better if you will complete surveys and questionnaires which he may send you and if you will give him your thoughts and opinions on the editorials and advertisements in his magazine.

You, the reader, are the *key person* to the publisher — and the BPA* audit helps him in his never-ending effort to think about you and design his magazine for you.

You, the reader, benefit when the circulation of a publication is audited by...

***BUSINESS PUBLICATIONS
AUDIT OF CIRCULATION, INC.**
420 Lexington Avenue New York 17, N. Y.



A Non-Profit, Tripartite Membership Corporation of Advertisers, Advertising Agencies and Business Publications

PACKAGING & SHIPPING

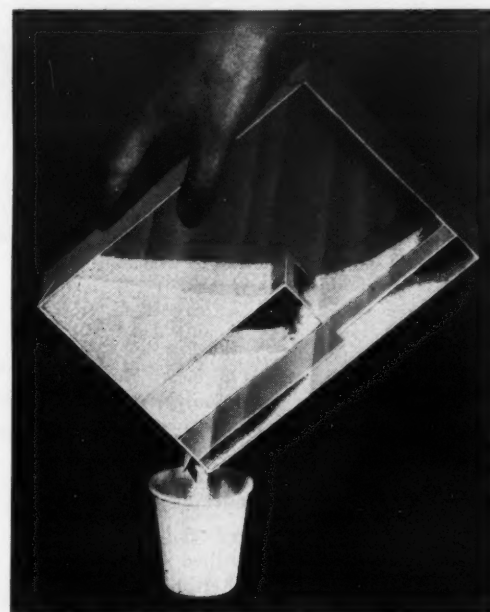
Built-in paperboard unit...

meters out carton contents

Unit is custom designed for delivery of any amount from teaspoon to several cups

Uses: Paperboard containers for dry, free-flowing solids such as detergents dispense contents in predetermined amounts.

Features: Paperboard metering unit is incorporated into carton by box manufacturer without increasing size of container because of volume



As measured amount discharges from carton, metering compartment is refilled through a hinged valve



Metering compartment's size determines amount of product dispensed

displacement. Cartons can be filled on conventional high speed machines. Accuracy is maintained from first to last pour. Increase in cost over standard containers is about 1/4c.

Description: Device, when in place inside container, provides a loading area (see photo) which is filled through a hinged valve simultaneously with discharge of contents. Material can not

PACKAGING & SHIPPING

fall out of opening through which loading area was filled since passage is blocked.

In using metered containers, box is merely turned over in usual manner and contents flows out, stopping when predetermined quantity has passed through. Meters are designed specifically to handle detergents, cereals, coffee, cocoa, dog food, sugar, and many similar items.

Some of the meters so far designed provide dispensing in teaspoon quantity — as for sugar. Triple measurement has been developed for large size soap containers.

(Meters are designed by United States Metered Container Corp., Dept. CP, 527 Madison Ave., New York 22, N.Y., which licenses the packer directly . . . check 9475 on form opp. last page.)

Details wrapping abilities of heat-sealable film

A six-page, four-color foldout brochure tells about manufacturer's heat-sealable polyester film. Sealable on one or both sides, the film can be heat-sealed with regular equipment to give a seal as strong as the film itself. Various applications of the film as a packaging medium and some of its physical characteristics are illustrated.

"Scotchpak" is issued by Minnesota Mining and Manufacturing Co., Dept. CP, 900 Fauquier St., St. Paul 6, Minn. Specify 9476 opp. last page.



"... and as for what we're doing with your money ..."



Unique? Yes! Because it's a Rheem steel pail. It was made by the world's largest producer of steel containers—RHEEM. That's a lot of experience working for you. As for protection for your product, the linings in Rheem steel pails are bonded directly to the steel and oven baked to prevent flaking and peeling. Rheem pails are available in 1-gallon to 15-gallon sizes; plain, colored or lithographed; lined or unlined; double head or crimp lug type covers. Why not call Rheem today and find out more about sending your products to market—first class—in Rheem steel pails.

YOU CAN RELY ON



MANUFACTURING COMPANY

Leading Producer of Steel Shipping Containers

LINDEN, N. J., SPARROWS POINT, MD., RICHMOND AND SOUTH GATE, CALIF., HOUSTON, CHICAGO, NEW YORK, NEW ORLEANS

RHEEM MANUFACTURING COMPANY
7600 S. Kedzie Ave., Chicago, Illinois

Please send me detailed information on Rheem Steel Pails.

NAME _____
COMPANY _____
ADDRESS _____
CITY _____ STATE _____

CP-12

When inquiring check 9477 opposite last page



Got a packaging problem?

Let us help you solve it

You can make your tough packaging jobs easier—and often less costly—with Pfaudler products and engineering help.

HERE'S WHY:

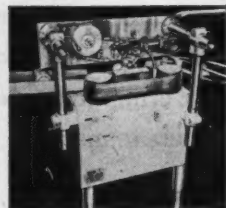
- Pfaudler offers you a complete line of rotary piston fillers, gravity fillers, and outsert applicators.*

You get the *fastest* filling possible with Pfaudler equipment—some models have actually been operated at as high as 1050 cans per minute! You get *cleaner* fill, too, because adjustable tilt controls prevent spillage. And some models of Pfaudler fillers can even fill small lots of *diversified* or widely varying containers.

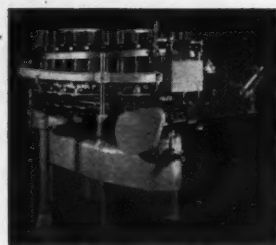
- At your request, qualified Pfaudler engineers will analyze your specific requirements. Then you'll know the right machine has been selected to do the job.

Learn more about how Pfaudler licks tough packaging problems. Contact your Pfaudler representative or write direct.

Ask for our free bulletins.



*The outsert applicator is a patented fast-action machine that attaches your message to the outside of your package—automatically! It's fully described in Bulletin 933.



RP-35 rotary piston filler—just one of several available piston fillers. Any one of them can package viscous or semi-solid products accurately and quickly. They're all described in Bulletin 911. For information on the many models of Pfaudler gravity fillers, request Bulletin 843.



THE PFAUDLER CO.

ROCHESTER 3, N. Y.

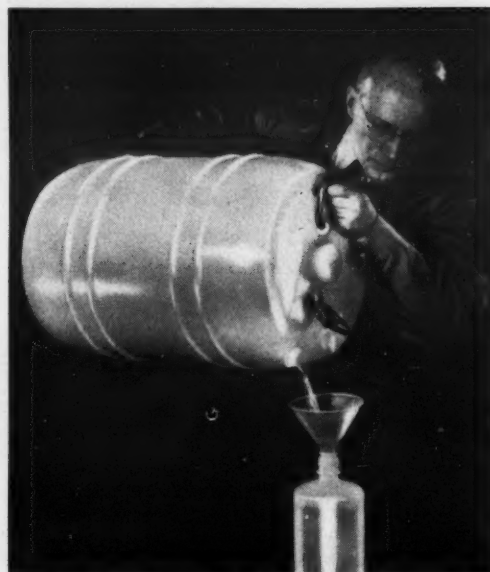
Specialists in corrosion engineering

When inquiring check 9478 opposite last page

PACKAGING & SHIPPING

**Has two folding handles,
hand-grip on bottom,
rolling chimes**

Barrel-like 13-gallon polyethylene drum, added to manufacturer's line of five, six and a half, and 13-gallon carboys, incorporate such features as two folding handles, pouring spout, separate opening for filling and venting, hand-grip on the bottom, and rolling chimes.



Drums are designed to nest and stack securely

Designed to permit stacking, container's folding handles and filling and pouring necks are located in a recessed area on top of the drum. Top and bottom contours are designed to permit containers to nest securely one on top of the other.

(Polyethylene drum is manufactured by Plax Corporation, Dept. CP, Hartford, Conn. . . . or for more information check 9479 on form which is located opposite last page.)

**Cans coded by small scratches
while moving along
conveyor line . . .**

series of inconspicuous scratches indicate batch, type, grade data

Uses: Coding instrument mounted on conveyor line notes information such as data on filling, plant, line and batch number, and type of product on metal can as it moves along conveyor line.

Features: Fifteen spring loaded carbide blades mark cans with series of inconspicuous scratches. Blades are selectively used and rapidly actuated by

New Union Special BAG CLOSER

for
**✓ FASTER
✓ EASIER
✓ SURER**

Bag Closing



Here's how to take advantage of new, high speed Class 53600 sewing heads Union Special now has available for closing filled bags: (1) Specify them for new installations, (2) Modernize machines you are now using. Of great interest to packing and shipping departments is the increase in speed possible. Rated speed has been increased 50 per cent over older 14500 type sewing heads. Conveyor speeds can be synchronized with the sewing head speed by changing sprocket. Let us give you complete information. See our nearest representative or write.

Union Special Machine Company
442 North Franklin Street • Chicago 10, Illinois

When inquiring check 9480 opposite last page

Miniature display windows



**PUT YOUR PRODUCTS IN
Clearsite PLASTIC JARS
FOR ALL TO SEE—AND BUY**

Clearsite Plastic Jars help increase sales, reduce shipping costs, practically eliminates breakage loss. They're moisture-tight, dust free, chemically inert. Easy to print or label. Stock sizes up to sixteen ounces.

Clearsite cylindrical plastic containers are produced in a wide variety of shapes, sizes, colors and closures. Write for free sample and descriptive literature to Department G.

CELLUPLASTIC CORPORATION

Sales and Executive Offices Newark, New Jersey

When inquiring check 9481 opposite last page

CHEMICAL PROCESSING

LIGHT BUT SO STRONG!

TOTELINE FIBERGLASS TRAYS

For Drying:
**CHEMICALS
PHARMACEUTICALS
ANTIBIOTICS**

They're feather-light, but they're durable and sturdy as any trays you've ever used! What's more, the large inside corner radii makes them very easy to clean. And, because fiberglass does not absorb heat, the materials dry faster in Toteline trays. Many sizes available. Write

TOTELINE
Wherever
materials
are handled

MOLDED FIBERGLASS TRAY CO.

World's largest producer of Fiberglass reinforced resin Trays, Tote Boxes

LINESVILLE, PENNSYLVANIA

When inquiring check 9482 opposite last page

ERTEL ASBESTOS FILTER SHEETS

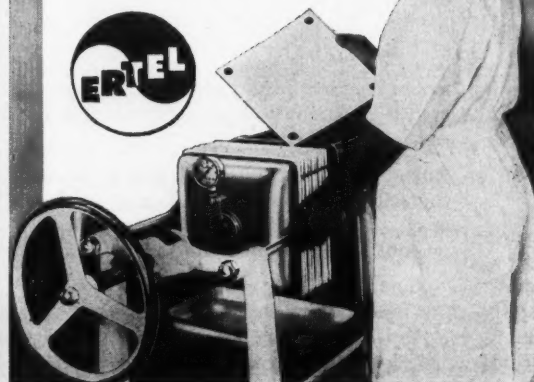
... Used where performance counts!

Ertel asbestos sheets are available in ten uniform grades for all filters up to 25" square. Manufactured under rigid control, they are acid treated to meet Ertel standards of low leachable calcium and iron content. Sheets are checked constantly by a reputable analytical laboratory. . . . Copies of their reports are available.

If you are not already a user of Ertel sheets, try them at no obligation on your next filtration run. We will test filter your product at no charge in our laboratory in order to recommend the correct grade.

ERTEL ENGINEERING

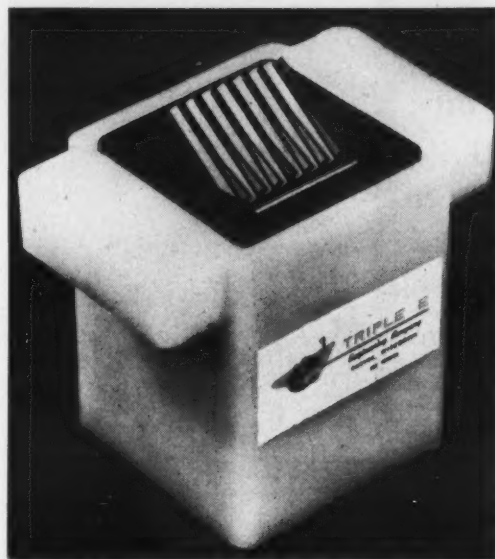
CORPORATION
KINGSTON 3 NEW YORK



When inquiring check 9483 opposite last page

DECEMBER 1956

PACKAGING & SHIPPING



Coding scratches are visible but not deep enough to penetrate coating of the can to point where corrosion may occur

tightening Allen head screws on bottom of unit.

Description: Requiring no separate operation, unit becomes part of canning line and is installed right in the conveyor system at a transfer point. Coder permits scratches of microscopic depth, visible, but not deep enough to penetrate coating of can to point where corrosion may occur. Maintenance is slight, requiring only occasional dressing of blades and application of powdered graphite.

Small coding card, designed to the requirements of the individual packaging operation, can be placed alongside scratches to translate information at a glance.

("Data-line" coding instrument is manufactured by Triple-E-Engineering Co., Dept. CP, Racine, Wisc. . . . or for more information check 9484 on form opposite last page.)

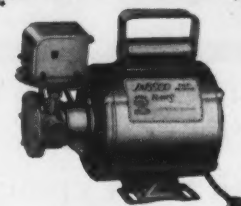
Cellulose wadding provides protective cushioning

Details on properties and uses of cellulose wadding are contained in eight-page brochure. Uses for protective packaging and cushioning, in bedding and quilting industries, in furniture and appliance production, and in filtering applications are outlined. Brochure points out efficiency and economy of product for diversity of packaging and cushioning uses.

"Cel-Fibe Cellulose Wadding" is issued by Cel-Fibe Division, Personal Products Corp., Dept. CP, Milltown, N.J. When inquiring specify 9485 on form opposite last page.

cut pumping costs with

JABSCO INDUSTRIAL PUMPS



Model 2187-50
PORTABLE PUMP & MOTOR UNIT
1/2" Port Size—With
Vacuum Switch

- ◀ INSTANTLY
SELF-PRIMING
- ◀ SIMPLE, COMPACT,
ONLY ONE
MOVING PART
- ◀ DURABLE NEOPRENE
IMPELLER
- ◀ SELF-LUBRICATED
- ◀ TROUBLE-FREE
OPERATION



HERE'S another Jabsco industrial pump — designed and built for chemical, pharmaceutical and other industrial applications. Ideal for transfer of various liquids and acids — sump drainage, coolant pumping, general transfer, pulp in solution, filtering, brines, plating solutions — even fluids containing foreign matter or particles, silt, crystals, and other gritty materials. Bronze, stainless steel or plastic construction is available to solve your specific pumping problems. Pumps either light or heavy viscous liquids. Temperature ranges from 35° to 180° F. Write for a Jabsco factory recommendation for your own needs. Specify application, fluid pumped, temperature, pressure, etc.

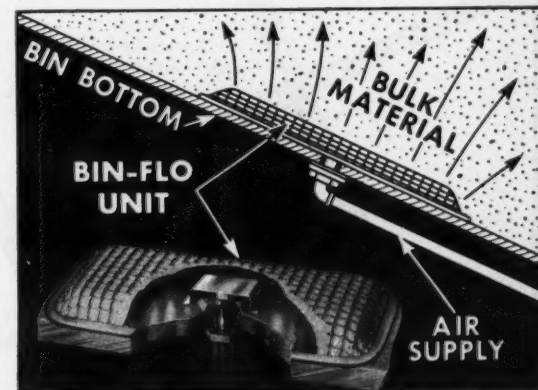
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AND
PATENTS
PENDING

JABSCO PUMP COMPANY

2031 Lincoln Street, Burbank, California

When inquiring check 9486 opposite last page



BIN-FLO USES SMALL VOLUME OF AIR AT LOW PRESSURE

KEEPS BULK MATERIALS MOVING

BIN-FLO units in bins, chutes, hoppers, etc., restore flow characteristics to dry, finely ground materials which tend to pack or bridge in storage. Types for all materials and conditions. No moving parts; simple installation; negligible operating cost; no maintenance cost.

BIN-DICATOR bin level indicator—"The Eyes of the Bin"—automatically reports levels of materials in storage; automatically controls filling machines; prevents waste.

THE BIN-DICATOR CO.

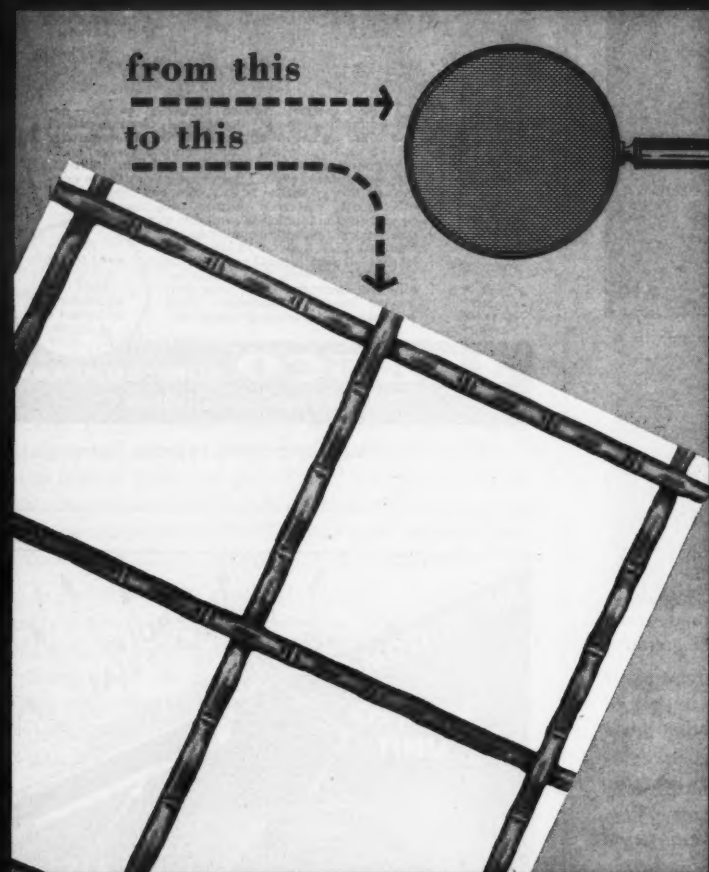
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with mesh openings



in 9 weaves
in any metal or alloy
in bulk or
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OFFICES IN PRINCIPAL INDUSTRIAL CITIES

LET US FILL your next order for wire cloth in any mesh or weave. Call your Cambridge Field Engineer—he's listed under "Wire Cloth" in your classified telephone book. OR, WRITE DIRECT for FREE 80-PAGE CATALOG and stock list giving full range of wire cloth available. Describes fabrication facilities and gives useful metallurgical data.

When inquiring check 9488 opposite last page

for the laboratory



CP Staff Photo

Operator turns crank to generate electricity for moisture test. Note grain samples in bread pans on bench and in storage bins

Lab oven tests for moisture took three hours. Conventional moisture instruments were tried but were wanting in reproducibility and led to high maintenance

then Ralston Purina discovered an . . .

accurate moisture test in five minutes

GORDON WEYERMULLER, Associate Editor
With **T. J. POTTS**, Mgr. of Analytical
Laboratories, Ralston Purina Co.
St. Louis, Missouri

Problem: At Checkerboard Square, Ralston Purina Company, St. Louis, a three-hour test was required to find moisture of a number of products by laboratory oven methods. This was too slow to keep up with plant requirements. In order to speed tests, plant tried several conventional

moisture testing instruments. Of these, however, all but one had poor reproducibility and high maintenance.

Among products tested are barley, bran, corn meal, oats, soybean meal, hog supplement, broiler chow, and many others. Reasons for testing moisture follow:

- Control stability of ingredients
- Control operation of grain dryers
- Grading of grains for purchase
- Calculate inventory shrinkage
- Control stability of finished product

Solution: Plant switched over to a moisture tester which compresses the sample to a uniform density within 0.001" of compression thickness and then passes an electric current through it to measure the moisture. At Ralston Purina 10 to 25 grams of sample is placed in cup, which is inserted in tester and compressed with a pressure of 12 tons by a mechanical press arrangement. A generator crank is then turned at a uniform rate to produce current which passes through sample and deflects meter.

A built-in thermometer continually indicates temperature since high pressure forces rapid equalization between sample and instrument. Other instruments tested required separate temperature determinations. Meter reading is then corrected for temperature and converted to percentage on a built-in correlator. Some materials require further correction to actual moisture (due to different electrical properties) by applying multiplication factor to correlator percentage. At Ralston Purina factor averages about 1.0, varying from 0.70 to 1.20, according to material being tested. A calibrated chart or conversion snap-ring for dial can be used to replace this final step.

One of several testers this manufacturer builds on the same general principles, this unit measures modified electrical resistance of the sample. But unlike most resistance (or conductance) moisture instruments, it does not use a bridge circuit. A 500 volt DC potential is generated by cranking during the test. Current from the hand-cranked generator is passed through the sample and through one coil of a dynamic meter movement. Current from the same source passes through a second coil of the meter. Meter reading is a dynamic balance (forced balance) between these two currents — thus it varies with resistance, or moisture content, of the sample.

Since the meter reading is a product of dynamic balance of currents from the generator, this reading is independent of the voltage generated — and, of course, no outside electric power is required.

Results: Present moisture tester gives a result in five minutes with an accuracy of ± 0.5 max error in the operating range of 8 to 25% moisture. Units can be fitted with an amplifier so they may be used for lower moistures. Company bought first moisture tester of this type several years ago and has obtained a number of others since that time. Recently, one was sent to one of company's Canadian plants. Company now uses about 15.

One reason laboratory people at Ralston Purina like the moisture tester is because it requires practically no maintenance even after several years use. Also, its portability is an advantage.

(Model EH Universal moisture tester is one of a series of testers made by Moore-Milford Corp. and is available through Burrows Equipment Co., Dept. CP, 1316 Sherman Ave., Evanston, Ill. . . . or check 9489 on form opposite last page.)

another example of exciting work at los alamos...

PAPERS ACCEPTED BY THE...



INTERNATIONAL CONFERENCE ON THE PEACEFUL USES OF ATOMIC ENERGY

"The Intermetallic Compounds of Plutonium,"
Coffinberry, A. S. and Ellinger, F. H.

"Time-of-Flight Techniques Applied to
Fast Neutron Measurements,"
Cranberg, L.

"Gamma Rays from Neutron Inelastic Scattering,"
Day, R. B.

"Some Techniques for Measurement of
Fast Neutron Flux,"
Diven, B. C.

"Los Alamos Power Reactor Experiments,"
Froman, D. K., Hammond, R. P. and King, L. D. P.

"The Preparation of Kilocurie La 140 Sources,"
Hammond, R. P. and Schulte, J. W.

"Chemical Processing in Intense Radiation Fields,"
Hammond, R. P.

"The Role of Liquid Scintillators in
Nuclear Medicine,"
Hayes, F. N., Anderson, E. C. and Langham, W. H.

"Delayed Neutrons,"
Keepin, Jr., G. R. and Wimet, T. F.

"Liquid Scintillation Counting of
Natural Radiocarbon,"

Hayes, F. N., Anderson, E. C. and Arnold, J. R.

"Design and Description of Water
Boiler Reactors,"
King, L. D. P.

"Determination of Fission Quantities of
Importance to Reactors,"
Leachman, R. B.

"A Review of Americium and Curium Chemistry,"
Penneman, R. A. and Asprey, L. B.

"Techniques for Measurement of Neutron Cross
Sections and Energy Spectra for Sources Which
are Continuous in Energy and Time,"
Rosen, L.

"Techniques for Measuring Elastic, Non-Elastic
and Transport Neutron Cross Sections,"
Taschek, R. F.

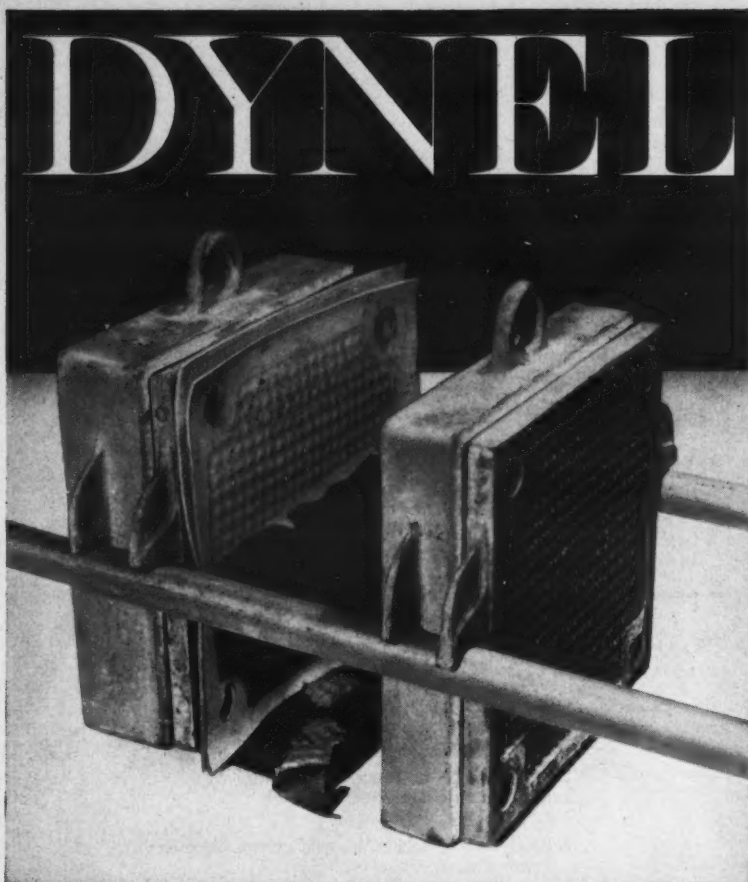
"Angular Distributions and Non-Elastic
Neutron Scattering,"
Walt, M.

Los Alamos Scientific Laboratory is a non-civil service operation of the University of California for the U. S. Atomic Energy Commission.

The diversification of the Los Alamos papers accepted at the Geneva Conference dramatically illustrates a few of the challenging research problems being explored at the Laboratory, which welcomes applications for employment from qualified scientists and engineers.

For more information, write:
Director of Scientific Personnel
Division 1502

los alamos
scientific laboratory
OF THE UNIVERSITY OF CALIFORNIA
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


UP TO 10 TIMES THE WEAR

in new non-woven filter fabrics

New non-woven DYNEL felt is engineered specifically for more efficient plate and frame filtration of dyestuffs and pigments. DYNEL's unique cross-section produces a high-density structure that retains fine particles without plugging. It makes possible quick cake formation and easy cake release. DYNEL's resistance to chemicals, abrasion and fiber-fatigue, means use life up to ten times as long as conventional fibrous materials.

These same properties are reasons why non-woven DYNEL fabrics are proving more efficient—as separators for alkaline batteries; for filtering air and corrosive liquids. For information, write:

DYNEL • UNION CARBIDE AND CARBON CORPORATION 
30 East 42nd Street, New York 17, N. Y.

When inquiring check 9490 opposite last page

FOR THE LABORATORY

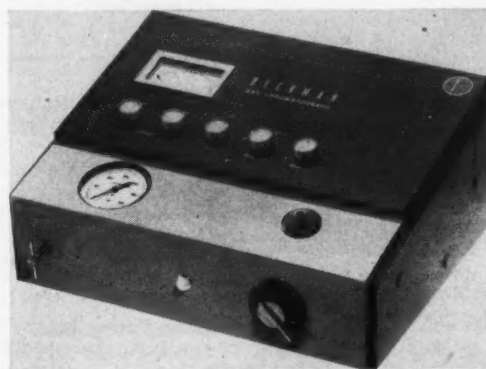
Resolves four chloromethanes in eight minute run . . .

chromatography unit is specifically designed for low boiling (80°C) liquids and gases

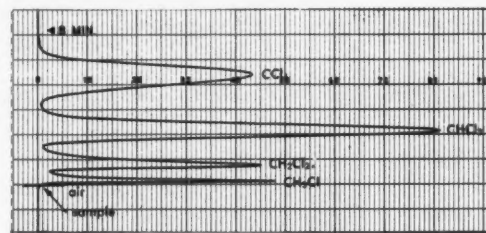
Uses: Specifically designed for fast analysis of gases or liquids with boiling points below 80°C.

Features: Typical performance was an analysis taking eight minutes which resolved the four chloromethanes.

Description: Small and compact, chromatography unit employs copper tubing with standard fittings as its columns. These are easily removed. Columns of any length can be used for absorption or partition chromatography.



Basic unit is designed for use with recording potentiometer if desired



Record of analysis of four chloromethanes in an 8 minute run

Samples are admitted through standard serum cap or a special sampling valve. Helium is used as carrier gas. Volume of emerging gas components is measured by diffusion thermal conductivity cell. One millivolt potentiometer recorder with one-second response can be used in conjunction with this analyzer. Sensitivity may be adjusted over a range from 1 to 20,000.

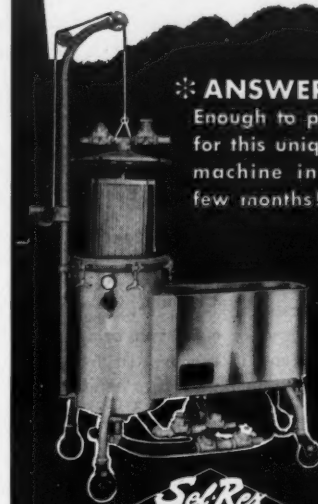
(Gas Chromatograph is a development of Beckman Division, Beckman Instruments, Inc., Dept. CP, Fullerton, Calif. . . or for more information reader may simply check 9491 on the Reader Service slip which is located opposite last page.)



Question:

How many extra
production hours
would you gain
if you CUT
FILTER CLEAN-UP
TIME 75%?*

*** ANSWER:**
Enough to pay
for this unique
machine in a
few months!



DOUBLE DUTY Liquid Clarification Solids Recovery FILTERS

It takes only 15 minutes to completely clean a Sel-Rex. Increased production is guaranteed because you spend more time filtering — less time cleaning. Uses either the new Sel-Rex stainless steel annular or leaf-type elements or a porous stone membrane — quick easy conversion to the element best suited to your operation.

Send for free filtration catalog today.

BART-MESSING CORP.

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When inquiring check 9492
opposite last page

CHEMICAL PROCESSING

**Has epon phenolic coating
for resistance to acid
or alkali fumes . . .**

laboratory fume hood has separate supply and exhaust plenums; turbulence-free atmosphere

Uses: As laboratory fume hood for safe experimental working area.

Features: Hood has epon phenolic coating for resistance to acid and alkali fumes, plus separate supply and exhaust plenums which deliver outside air and remove fumes.

Description: Laboratory fume hood is constructed of sheet metal. Arrangement of supply air and exhaust provides a turbulence-free atmosphere for controlled experiments. A 3x4' reinforced safety glass door is counter-balanced for easy accessibility. Visibility is aided by built-in fluorescent illumination. Hood design allows reduction in loss of cooled air, up to a saving of 1/2-ton of refrigerating capacity per hood.



Fume hood provides turbulence-free atmosphere for controlled experiments

(Laboratory fume hood is product of The Kirk & Blum Company, Dept. CP, Cincinnati 9, Ohio . . . or check 9493 on form opposite last page.)



Cartoonist Al Kapkowski works at the Bayway Refinery of Esso Standard Oil Co., Linden, N. J.

Pumps viscous liquids and semisolids without churning or chopping

New, air-operated *Ejectopump* works with a powerful yet gentle action. Whole grapes or even live goldfish can be pumped without crushing. "Handle with care" viscous materials such as latex are pumped without shear or turbulence. Because there's no churning or whirling action, *Ejectopump* is also ideally suited for pumping pottery slip, gritty slumps and other highly abrasive liquids.

Ejectopump needs practically no maintenance. Has no rotating or reciprocating parts, no bearings, no packing. Needs no lubrication. Quickly disassembled for cleaning.

Operation

Connect to any compressed air line 30 to 50 psi. Handles discharge heads up to 100 ft., with maximum suction 20 ft. Discharge rate may be precisely regulated. Pump is self-priming, may be installed above level of liquid pumped. Can be furnished in special alloys for pumping corrosives. Sizes: 1 1/2", 2", 3", 4", 6".

WRITE TODAY for complete information and prices



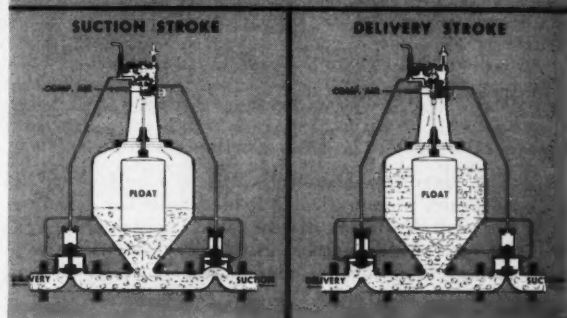
FERRO CORPORATION
Supplies Division

4150 East 56th Street, Cleveland 5, Ohio



Needs no lubrication
No rotating parts
No bearings
No packing

No vibration problem
Needs no special
foundation

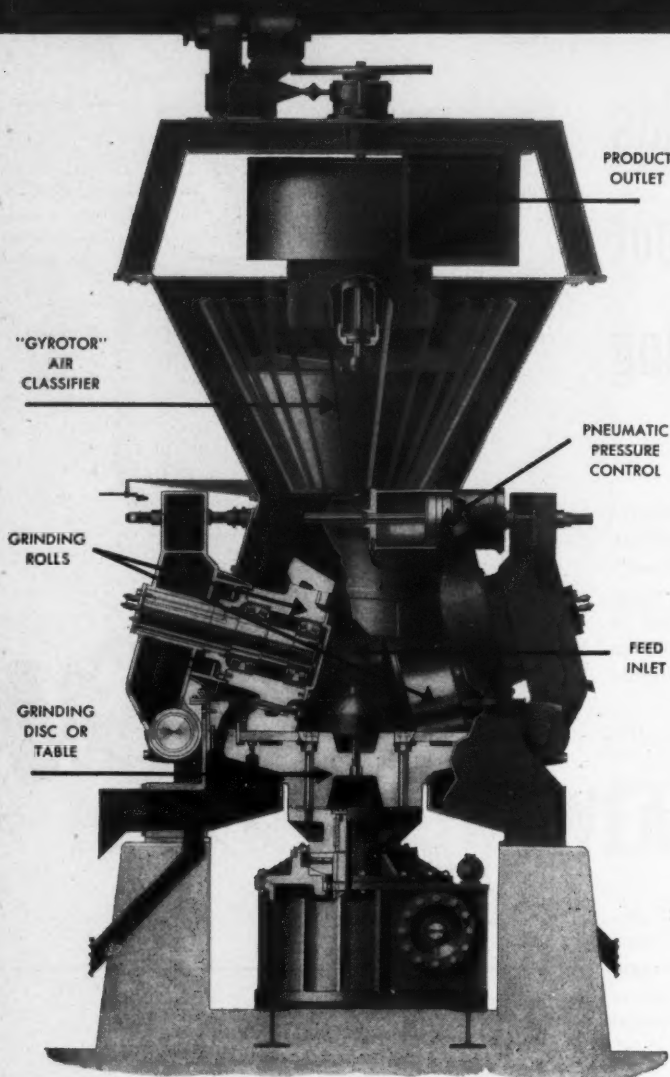


Ejectopump

COMPRESSED AIR OPERATED

When inquiring check 9494 opposite last page

DISC-ROLL MILL



The Hardinge Disc-Roll Mill is a roller-type mill with two adjustable, pneumatically loaded rolls for grinding material on a horizontal rotating disc or table (Loesche type). The Hardinge "Gyrotor" Air Classifier, in combination with the mill, provides a complete grinding, classifying, and drying system. A full description is given in Bulletin 52-13.

HARDINGE

COMPANY, INCORPORATED

YORK, PENNSYLVANIA • 240 Arch St. • Main Office and Works
New York • Toronto • Chicago • Hibbing • Houston • Salt Lake City • San Francisco

When inquiring check 9495 opposite last page

LABORATORY

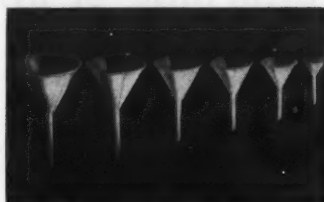
**Polyethylene funnels
can be autoclaved
to 250°F . . .**

have internal ribbing to
provide air release

Uses: As laboratory funnels
designed especially for use with
filter paper.

Features: Funnels have internal
ribbing so that air release is pro-
vided for rapid filtration.

Description: Laboratory fun-
nels are molded from linear poly-



Six laboratory funnels of linear PE

ethylene and are an exact 60°. Internal ribbing is at 58°. Being of linear polyethylene, the funnels are quite rigid and can be autoclaved to 250°F. Seven sizes are available from 35 to 160 mm diameter.

(Nalgene HH funnels are product of The Nalge Company, Dept. CP, P.O. Box 365, Rochester 2, N. Y. . . or for more information check 9496 opposite last page.)

Describes control system for magnetic fields

Two-color brochure of four pages describes magnetic field control system for stabilizing and regulating electromagnetic fields. Applications suggested include control of mass spectrometers, particle accelerators, cyclotrons, beta-ray spectrometers, other laboratory instruments using magnetic fields.

"Magnetic Field Controls" is issued by Nuclear Magnetics Corporation, subsidiary of The Perkin-Elmer Corporation, Dept. CP, 154 Boylston St., Boston, Mass. Specify 9497 opp. last pg.



Despatch LAB OVENS put to production use

TELEX, INC., St. Paul, is doing a lot of encapsulation work these days—and Despatch Laboratory Ovens have become an important production tool. In the manufacture of many items, the components and finished assemblies must undergo extreme tests for temperature and humidity. So, to absorb the shock, components are pre-encapsulated in foam plastic then air dried and heat cured at close temperature tolerance to meet rigid specifications.

Telex particularly likes the Despatch "Whirl-blast" forced air convection system, so essential in this operation. And the ability of the ovens to maintain an exact temperature is an "absolute" in the Telex quality control system. For information on how Despatch Laboratory ovens can work into your production setup, write for Bulletin No. 100.

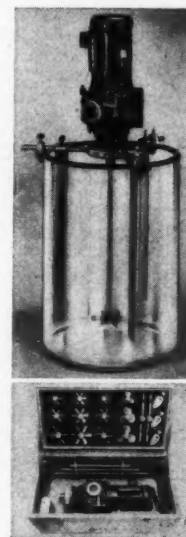
Manufacturers of ovens for DEHYDRATING . . . CURING . . . PAINT FINISHING . . . ALL INDUSTRIAL AND LABORATORY APPLICATIONS.

DESPATCH
LABORATORY OVENS

DESPATCH OVEN COMPANY
343 Despatch Bldg. • Minneapolis 14, Minn.

When inquiring check 9498 opposite last page

NEW EXPERIMENTAL AGITATOR AIDS MIXING SCALE-UP



Model ELB fluid agitator kit provides the first complete laboratory tool for determining agitation requirements of a specific process operation. Bench or pilot plant scale-up is accurate, convenient because you control all variables. Micrometer controlled transmission gives 0 to 1100 rpm. Kit includes 22 scale replica impellers, three shafts, universal mounting, illustrated hand-book. SEND FOR BULLETIN 109.

CHEMINEER, INC.

Fluid Mixing Engineers

1044 EAST FIRST ST.,

DAYTON 2, OHIO

When inquiring check 9499 opposite last page

CHEMICAL PROCESSING

Miniaturized pH meter is pocket-size

Uses single combination electrode and has a "memory" dial for standardizing

Uses: As pH meter in research and testing laboratories, plant operations where acidity and alkalinity measurements must be made with accuracy yet portability of instrument is desirable.

Features: Meter uses single combination electrode and has a "memory" dial for standardizing.



"Pocket" pH meter can be operated with one hand

Description: Pocket-sized pH meter is battery-operated instrument with range from 2 to 12 pH. Single electrode combines both reference and glass electrodes and was especially developed for use with the meter. Instrument operates from simple, inexpensive batteries as are used in flashlights and hearing aids.

("Pocket pH Meter" is product of Scientific Instruments Division, Beckman Instruments, Inc., Dept. CP, Fullerton, Calif. . . or for more information check 9500 on form opposite last page.)

Describes analytical apparatus for chromatography

Analytical instruments for separation and analysis of any gaseous or vaporizable liquid mixture are subjects of an eight-page folder. Equipment models are pictured, and their applications given. Information on special training courses or instruction in analysis of gases and vaporizable liquids is included.

"Analyze Almost Anything Accurately" is issued by Podbielniak, Inc., Dept. CP, 341 E. Ohio St., Chicago 11, Ill. Specify 9501 opposite last page.

Do Factors like these...

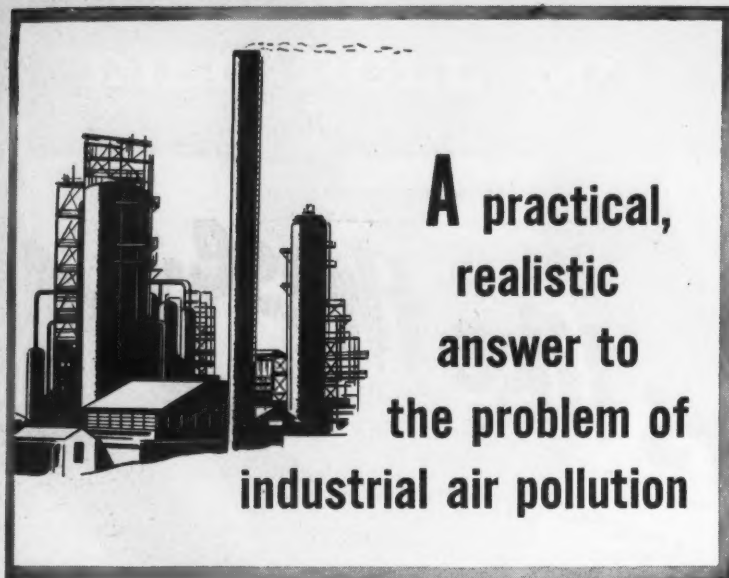
- CORROSION
- OXIDATION
- STRUCTURAL STRENGTH
- TOLERANCES
- APPEARANCE
- FABRICATION
- CONTAMINATION
- SPECIAL SHAPES
- ANALYSES

make your Stainless tubing choice extra tough?



Seamless and welded tubular products, seamless welding fittings and forged steel flanges—in carbon, alloy and stainless steels

When inquiring check 9502 opposite last page



A practical, realistic answer to the problem of industrial air pollution

**Catalytic oxidation can now eliminate
objectionable fumes and odors from your stack exhausts
effectively, efficiently — and often at an actual saving
— with the use of Houdry Oxycats®**

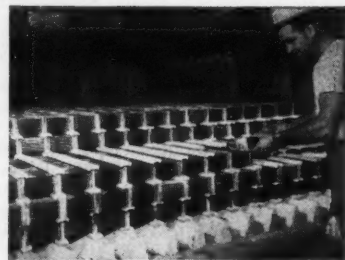
Properly engineered to your individual requirements, Houdry catalytic installations can eliminate, or reduce below objectionable levels, harmful and irritating fumes and odors in an exhaust stream.

These Oxycat installations are working effectively for a wide range of industries where combustible and organic pollutants are present, including solvents, phenols, formaldehyde, phthalic anhydride, polyethylene and carbon monoxide. Oxycats can also be used to oxidize H₂S and organic sulfides and to reduce oxides of nitrogen. And in many cases the heat released by the oxidation process will result in important fuel savings.

The key to any successful catalytic installation, of course, is the catalyst itself. Oxycats have an outstanding advantage in their exceptionally long life at high efficiency. There's no problem of frequent cleaning or reprocessing because of the Oxycat's remarkable ability to withstand contaminating agents and clogging.

It's best to design Houdry Oxidation Catalyst installations into your plant

when it is in the blueprint stage. But your engineers, working with ours, can effectively install Oxycats in any existing plant. If air pollution is a problem in your operation—if foul-smelling, irritating fumes and odors are costing you neighborhood good will—Houdry Oxidation Catalysts present a solution you cannot afford to overlook. Write on your business letterhead for complete information now.



Houdry Oxycats being installed in a waste heat boiler at a Sun Oil Co. catalytic cracking unit at Marcus Hook, Pa. This Oxycat installation and a similar one at Toledo save Sun Oil \$400,000 a year by oxidizing waste gases to generate 100,000 lb. of process steam an hour.



A Houdry Catalyst

OXY-CATALYST, INC.

INDUSTRIAL DIVISION

Wayne 7, Pa., U.S.A.

**Fume Elimination Processes and Equipment
Industrial • Automotive • Consumer Products**

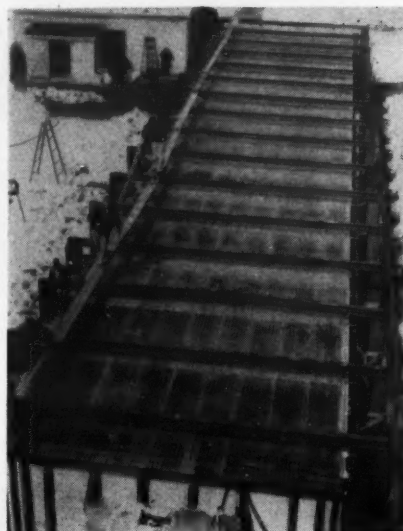
Representatives in major industrial areas

When inquiring check 9503 opposite last page

safety

Results of Factory Mutual Lab tests show that . . .

polyester structural panels flame under



Furnace, with roof of polyester panels . . .

. . . reached temperature of 1200°F during test. Flame (arrow) broke through paneling immediately over firing apparatus, serving as heat vent and lowering interior temperatures



Said to be "combustible under flame but not flame-transmitting," fire-retardant polyester-and-glass-fiber paneling is the first such material to carry both Underwriters' Lab and Factory Mutual acceptance.

This structural plastic panel, chiefly used in wall daylighting and skylighting, was approved as a "fire retardant type" after large-scale roof deck tests by the Factory Mutual Labs.

The resin used in fabrication of panels is Hetron, fire-resistant polyester developed by Hooker.

Roof deck tests consisted of subjecting panels, mounted on test furnace, to controlled heat for 30 minutes. Furnace, constructed of mineral tile, was 100 feet long, 20 feet wide, 10 feet high, and open at one end. Firing apparatus was set into closed

First 40 feet of paneling was damaged beyond repair, some damage was found up to 60 feet from flame, and last 40 feet were in excellent condition



els er will not transmit 1200° F heat

end and heat was produced by firing vaporized gasoline. In operation, furnace acted like horizontal chimney.

After about 1½ minutes of firing, first vapors began to curl up from panels . . . ignition occurred directly over firing apparatus in about 2½ minutes. Maximum temperature, about 1200°F, was reached after slightly over four minutes. Two panels burned through directly over flames but this served as a heat vent and temperatures then began to drop throughout entire structure.

Inspection of the roof deck at conclusion of test showed that first 40 feet of paneling was damaged beyond repair, some warping and fractures were found up to 60 feet from heat source, and last 40 feet of paneling was in excellent condition.

Results of test showed that material could not contribute to property loss in case of fire. Factory Mutual concluded its report on the tests with the statement that where the material was "used in conjunction with a non-combustible supporting structure, automatic sprinklers may be omitted where permissible under standards of the Factory Mutual Engineering Division."

(Pletron polyester resins are produced by Hooker Electrochemical Company, Dept. CP, Buffalo Ave. at 47th St., Niagara Falls, N.Y. . . . or for more information check 9504 on form opposite last page.)

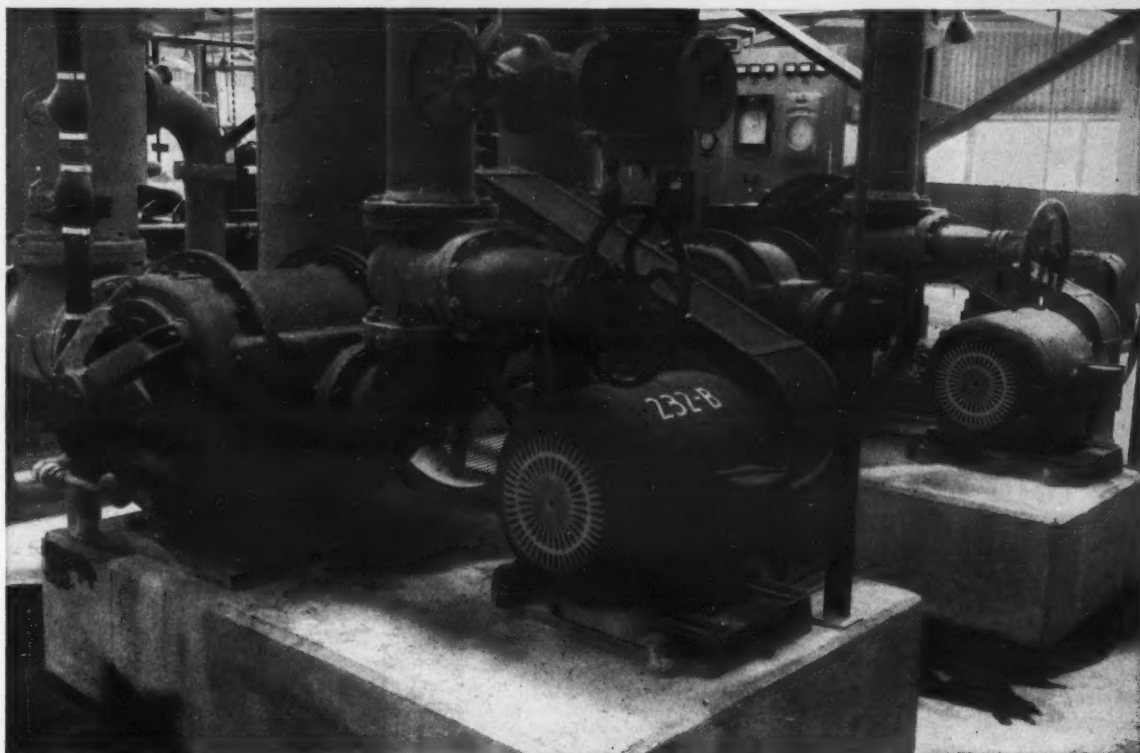
("Fire-Snuf" panels are produced by Resolite Corporation, Dept. CP, Zelienople, Pa. . . . or for more information check 9505 on form opposite last page.)

Calendar features safety reminders

Monthly safety slogans and common sense safety pointers are presented on calendar with colored frameable pictures. Limerick contest found on back of calendar pages, each month, awards cash prizes to winning contestants.

"The National Safety Calendar" is issued by the National Safety Council, Dept. CP, 425 N. Michigan Ave., Chicago 11, Ill. When inquiring specify 9506 on form opposite last page.

WAGNER ELECTRIC MOTORS...THE CHOICE OF LEADERS IN INDUSTRY



Designed for use in chemical plants WAGNER EP MOTORS

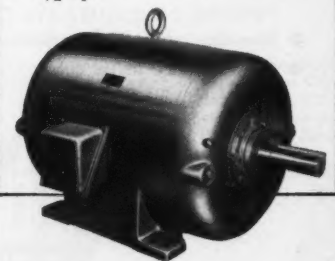
Here are stock motors specifically designed for the chemical industry —they're fully protected against corrosive fumes and liquids, dust, dirt or moisture.

Such protection is assured by totally-enclosed fan-cooled construction in corrosion-resistant cast iron frames. Extra protection is given the laminations by a wall of cast iron that completely surrounds the stator. Even though the

windings are completely enclosed, they are treated with a special coat of varnish that resists acids and alkalis. A running shaft seal, sealed leads and a gasketed conduit box give still further protection to these motors.

A skilled Wagner engineer, expert in motor applications, can help you select the Wagner Motor that meets your most exacting specifications. Call the nearest of our 32 branch offices, or write us.

Wagner Chemical Plant Motors are available in ratings from 1 to 250 hp in standard (Type EP) and explosion-proof (Type JP) designs, and in Non-ventilated corrosion-resistant standard and explosion-proof types in ratings from ½ through 1½ hp.



Wagner Electric Corporation
6359 Plymouth Ave., St. Louis 14, Mo., U.S.A.

BRANCHES AND DISTRIBUTORS IN ALL PRINCIPAL CITIES

ELECTRIC MOTORS • TRANSFORMERS • INDUSTRIAL BRAKES • AUTOMOTIVE BRAKE SYSTEMS-AIR AND HYDRAULIC

When inquiring check 9507 opposite last page

IN STOCK!

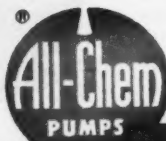
a low-cost, low-volume pump
for corrosive liquids!

\$98



CHECK these Eco All-Chem pump features against your needs:

- Capacities: 1-10 gpm at 1750 rpm, up to 150 psi.
- Metal housing: Type 20 or Type 316 stainless steels; Hastelloy C.
- Impellers: Teflon, Neoprene, Formica.
- Flow characteristics: linear non-surfing, non-foaming, non-aerating . . . lowest corrosion rate in pump and accessory piping.
- Positive displacement . . . high suction lift . . . self-priming with non-volatile liquids . . . operates in either direction.
- Drives: Direct motor, V-belt or vari-speed pulley drive.
- Standard parts mass produced and stocked for immediate shipment and for complete interchangeability.
- Adaptable for constant volume transfer, for agitating and pumping shear-sensitive fluids under pressure, and for constant flow metering.
- Handles organic, inorganic, hazardous and radioactive fluids.
- Lowest price in its class . . . the most pump and pump performance for your money.



ECO

ENGINEERING COMPANY

the big name in small pumps

12 NEW YORK AVE. • NEWARK 1, N. J.

When inquiring check 9508 opposite last page

SAFETY

Feeds piped dry chemicals for control of fires

Operates automatically or manually for flammable liquid, electrical hazards

Uses: As fire extinguisher system for moderate-sized hazards as paint and dip operations, small transformer vaults, heat-treating and oil-quench operations, ovens, overhead cranes, stationary engines, and textile-lint hazards.

Features: Fire extinguisher system can provide total-flooding or local application depending upon requirements of hazard.

Description: Fire extinguisher consists of a



Dry chemical piped system with automatic-mechanical release. Automatic release (upper right) activates unit when fusible metal link parts

30-pound capacity dry chemical unit installed near hazard and serving as a storage tank for chemical. A special CO₂ gas pressure cartridge furnishes pressure to expel dry chemical onto fire through piping connecting dry chemical unit with hazard area. Special nozzles are provided to give most efficient discharge of dry chemical for each type of application.

Automatic operation occurs when heat of fire causes a fusible metal link located above hazard to part. Impulse is transmitted to release mechanism located at dry chemical unit. Release mechanism causes cartridge to be punctured, pressurizing extinguisher, and forcing its dry chemical charge into piping leading to nozzles.

Accessory equipment such as remote manual pull stations, devices for ringing alarm bells, shutting down motors, closing windows and doors, is also available.

System has a special bracket for simplified mounting and easy removal for recharging. Extinguisher can be recharged on the spot and put back into service immediately after a fire.

(PS-30 Fire Extinguisher is product of Ansul Chemical Company, Dept. CP, Marinette, Wisc. . . or for more information check 9509 opp. last page.)

GONE!
BUT NOT FORGOTTEN

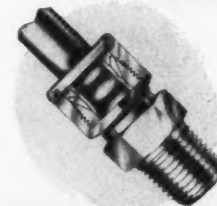


Legs
and
Feet

FROM MEN
WHO IGNORED
SAFETY RULES!

We think it is
smarter to play
safe all the time
Observe every
safety rule
and use

Swagelok®
FITTINGS



GET ALL THE FACTS: Write for the Swagelok catalog. Address Dept. C-1.

CRAWFORD FITTING CO.

884 EAST 140TH STREET
CLEVELAND 10, OHIO

When inquiring check 9510
opposite last page

CHEMICAL PROCESSING

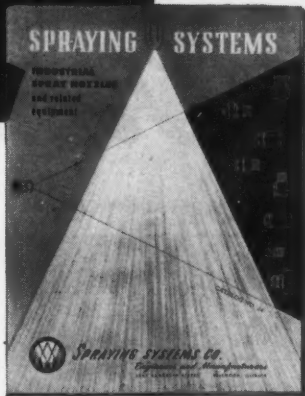
SPRAY NOZZLE

write for
your free
copy today

REFERENCE MANUAL

SPRAYING SYSTEMS

- to help you improve a spraying operation
- to help you lower a spraying cost



The most complete industrial spray nozzle catalog ever produced. Gives you reference data on thousands of standard and special spray nozzles for every type of spraying.

WRITE FOR your free copy of Catalog No. 24

SPRAYING SYSTEMS CO.
3216 Randolph St. Bellwood, Illinois

When inquiring check 9511 opposite last page

MORE WEAR PER PAIR



SURETY TRIPL-PALM COATED FABRIC GLOVES

2way
savings

TOUGHEST WHERE WEAR IS ROUGHEST

Tripl-Palm design eliminates the usual "failure points"—provides extra heavy palm coating for extra wear and comfort.



NO SEAM HERE

Nothing to rip out—wing thumb construction assures multiplied service life.

SEND FOR FREE
BULLETIN TODAY
Get all the facts,
write for Tripl-
Palm bulletin.



In Canada: Safety Supply Co., Toronto

When inquiring check 9512 opposite last page

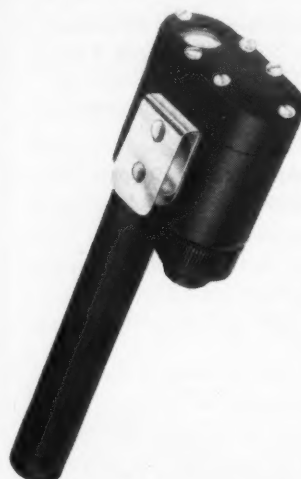
DECEMBER 1956

SAFETY

Charger combined with dosimeter in one unit

Uses: Personal portable dosimeter monitors dosage of radioactivity.

Features: Self-contained friction-type electrostatic generator requires no batteries of any kind and will operate under extreme environmental conditions. Voltage regulator prevents excessive overcharging of the unit.



Voltage regulator prevents excess overcharging of dosimeter

Description: Entire unit can be worn on belt or in pocket. Available in ranges from 200 milliroentgens to 600 roentgens depending on user's requirements, models meet military and civil defense specs for accuracy, response, leakage, temperature, immersion, vibration and shock. Operating life is virtually unlimited.

(Radiac dosimeter is product of Chatham Electronics, Div. of Gera Corp., Dept. CP, Livingston, N.J. Check 9513 opp. last page.)

Permeability of polyethylene to selected common solvents is just one of the convenient nomographs found in this issue starting on page 192

CESCO RIGHT...before your Eyes!

Approved
Organic Vapor
Respirator
No. 99



Bureau
of Mines
Approved—

ENTIRELY NEW Organic Vapor Respirator

• Here is an entirely new Dual Cartridge Respirator which carries Bureau of Mines approval. It is designed for use in organic vapors or acid gases. Twin 85 cc cartridges reduce breathing resistance to a minimum.

Rebreathing of exhaled air is prevented by positive-acting inhale and exhale check valves. Cartridges are easily replaced by removing screw-type caps. Valves and headbands are quickly replaced without tools.

A newly designed facepiece, with special attention to nasal contours, provides a snug, leak-proof fit with moderate headband tension. Dual headbands permit proper balance and adjustment for perfect seal along all facial contours.

Contact your nearest CESCO Distributor today for full information and prices on the complete line of respirators to meet every type of industrial requirement.

Write for complete Catalog

CHICAGO EYE SHIELD COMPANY

2316 Warren Boulevard, Chicago 12, Illinois

OFFICES IN: Atlanta, Baton Rouge, Birmingham, Boston, Buffalo, Cincinnati, Cleveland, Columbus, Dallas, Denver, Detroit, Houston, Kansas City, Knoxville, Little Rock, Los Angeles, Louisville, Mexico City, D.F., Milwaukee, Montreal, Orange, Peoria, Philadelphia, Pittsburgh, Salt Lake City, San Mateo, Spokane, St. Louis, St. Paul, Toledo, Tulsa



Single-filter
Dust Respirator
No. 80



Approved
Dust Respirator
No. 94



Approved
Supplied-Air
Respirator
No. 600



Approved
Dust Respirator
No. 96 with
high filtration
and low
breathing
resistance



Light-duty
Respirator
No. 81

CESCO



FOR SAFETY

When inquiring check 9514 opposite last page

SAFETY

How flammable liquids are safely used

Three sections of continuing series on use of flammable liquids in plant operations are available in loose leaf cover binder, with ample space for remaining sections. When completed, series will cover safe practices in use of flammables in every department of typical plant. Table in first section lists factors determining the degree of danger for nineteen flammable liquids most commonly used in manufacturing processes.

"Flammable Liquids, — Their Characteristics, Hazards, and Safe Handling" can be obtained from Editor, Technical Services Publications, The Protectoseal Company, Dept. CP, 1920 S. Western Ave., Chicago 8, Ill. When inquiring specify 9515 on form opposite last page.

Discusses air sampling and measurement

Air sampling and measurement program for air pollution control is described in five-page bulletin. Sampling and measurement methods are outlined. Instruments and methods referred to include carbon monoxide recorder, sulfur dioxide autometer, nitrogen dioxide and nitric oxide recorder, km sampler, total oxidant recorder, ether-soluble aerosol sampler, hydrocarbon sampler, aldehyde and ketone sampling, ozone measurement, and dust-fall measurement. Map shows location of air sampling stations. Value and results of air sampling are summarized.

Smog Brief 10, "Air Sampling and Measurement", is issued by Air Pollution Control District, Dept. CP, 434 South San Pedro, Los Angeles 13, Calif. When inquiring specify 9516 on form located opposite last page.

Can be triple-duty lifesaver— resuscitator, aspirator or inhalator . .

entire unit can be carried by one person

Uses: As light-weight portable respirator which can serve as resuscitator, aspirator, or inhalator for critical emergencies — heart attacks, drowning, carbon monoxide poisoning, electric shock, strangulation, and asthma.

Features: Respirator can be used as resuscitator, aspirator, or inhalator. Unit is light enough to be easily carried by one person.

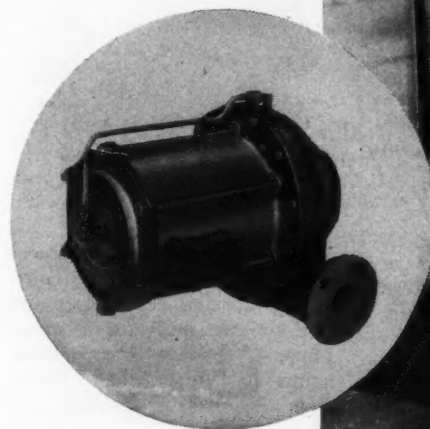
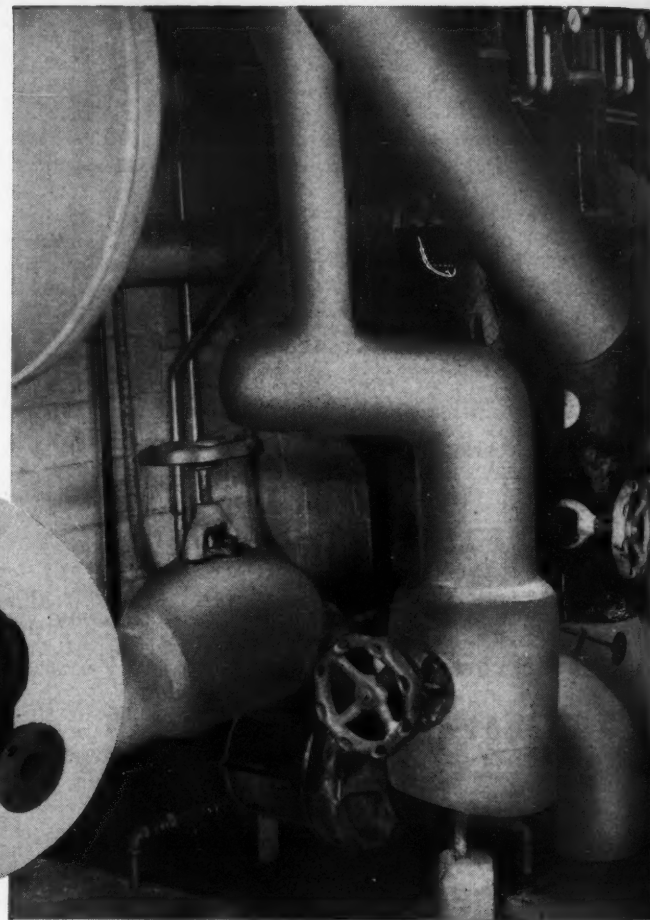
Description: Respirator is simple to operate. As resuscitator, it automatically inhales and ex-

★ **no seals...no stuffing box**

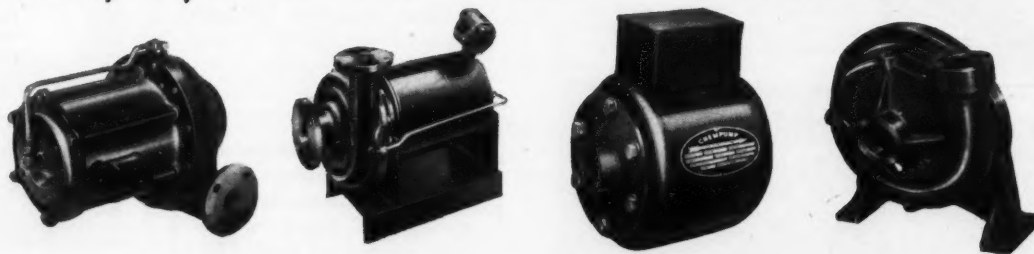
Chempump

Chempump installed in American ENKA's Nylon Research Pilot Plant, Enka, North Carolina. 1 hp pump handles Doutherm at temperature of 520°F.

Pump capacity: 60 gpm.
Discharge head: 30 ft.



Chempump — first in the field . . . process proved



for hard-to-handle HOT OILS

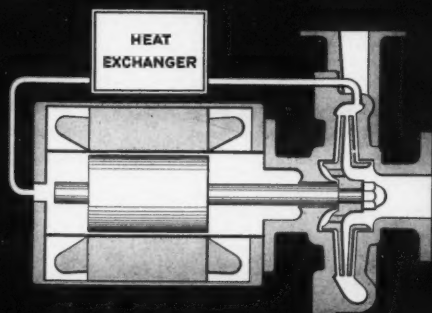
pumps heat transfer fluids, hot vegetable and mineral oils, silicone fluids...without leakage or contamination

Hot oils are often hard to handle with conventional centrifugal pumps. Low surface tension and increased wetting action increase the problems of leakage, fluid loss, contamination, and maintenance. Besides being messy and expensive, leakage can present a real danger with some fluids.

Chempump, by its very design, prevents these problems. With no shaft sealing device of any sort, *Chempump* can't possibly leak! Absence of a stuffing box means no packing lubricant—therefore no contamination even under extreme vacuum or pressure... especially important when handling hot vegetable oils.

Chempump can handle fluids at temperatures up to 450°F without need for special cooling devices. Use of a simple heat exchanger in the circulating

Engineering representatives in over 30 principal cities in the United States and Canada.



Sectional view of Model CHS *Chempump*. Heat exchanger in circulating line used for applications in the 450°–700°F range.

line permits pumping of hot oils from 450°–700°F.

Chempump's seal-less design combines pump and motor in a single hermetic unit. Pump impeller and rotor are an integral unit. Statically and dynamically balanced, the rotor-impeller combination forms the only moving part. Pumped fluid enters the rotor chamber, isolated from the stator section by a corrosion-resistant, non-magnetic liner. No shaft sealing device is required.

Chempump seal-less pumps are proving their worth in thousands of money-saving installations throughout the world. Normally hard-to-handle fluids—hot, volatile, toxic, corrosive, explosive, sensitive, radioactive—just can't leak or become contaminated. For capacities, heads, and other application information, send for new 16-page *Bulletin 1010*.

Chempump

CHEMPUMP CORP. • 1300 E. MERMAID LANE • PHILADELPHIA 18, PA.

Please send me details on use of *Chempump* for:

(application)

Capacity _____ Total dynamic head _____

Name _____ Title _____

Company _____

Address _____

City _____ Zone _____ State _____



Resuscitator automatically inhales and exhales for person being treated

hales for patient being treated and automatically adjusts to his lung capacity. As an aspirator, it furnishes sufficient suction to clear water, mucus, or vomitus from throat. As inhalator, it supplies oxygen to be absorbed by spontaneous respiration.

Resuscitator is used with standard masks or, through an adapter, with any size tube or catheter for intubation or tracheotomy. The head can be readily removed and sterilized in boiling water.

Breathing mechanism of unit can be used 200 ft away from oxygen supply. Carrying case is made of aluminum alloy and is impervious to moisture, grease, and stains. Case accommodates two standard "D" oxygen cylinders. Weight without cylinders is 26 lb. Dimensions are 24 1/4 x 8 3/4 x 18 1/4".

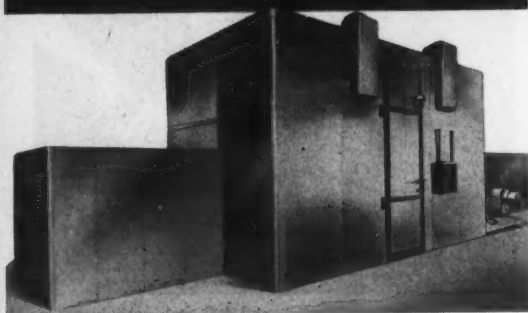
("Handy" resuscitator is distributed by National Cylinder Gas Company, Dept. CP, 840 North Michigan Ave., Chicago 11, Ill. . . or for more information reader may simply check 9519 on form which is located opposite last page.)

Destaticizes synthetic fibers — permanently

The chemical resistance of synthetic fibers makes them popular for work clothing in our chemical processing industries. However these synthetics tend to build up static electricity — hence, big risk around highly flammable materials. Non-permanent anti-static agents that "come out in the wash" have been available. Now a permanent treatment has been developed. Details on page 54.

When inquiring check 9517 opposite last page

*This Small Dryer Has
Everything... Including
Provision for Expansion*



"NATIONAL" APRON CONVEYOR DRYER

While this comparatively small Apron Conveyor Dryer was installed to immediately provide pilot plant production, it is readily adaptable to expansion to meet future large-scale production requirements. It incorporates all the features available in the largest "National" Dryers of this type, including the following:

The most efficient air control devices, to assure absolute uniformity of temperature, humidity and distribution of the air through the material.

Wide flexibility in air delivery by use of adjustable pitch fans.

Adjustable sealing of air to eliminate leakage and dust carry-over to chain and other parts of equipment.

Newest heavy-duty trussed-type apron hinges.

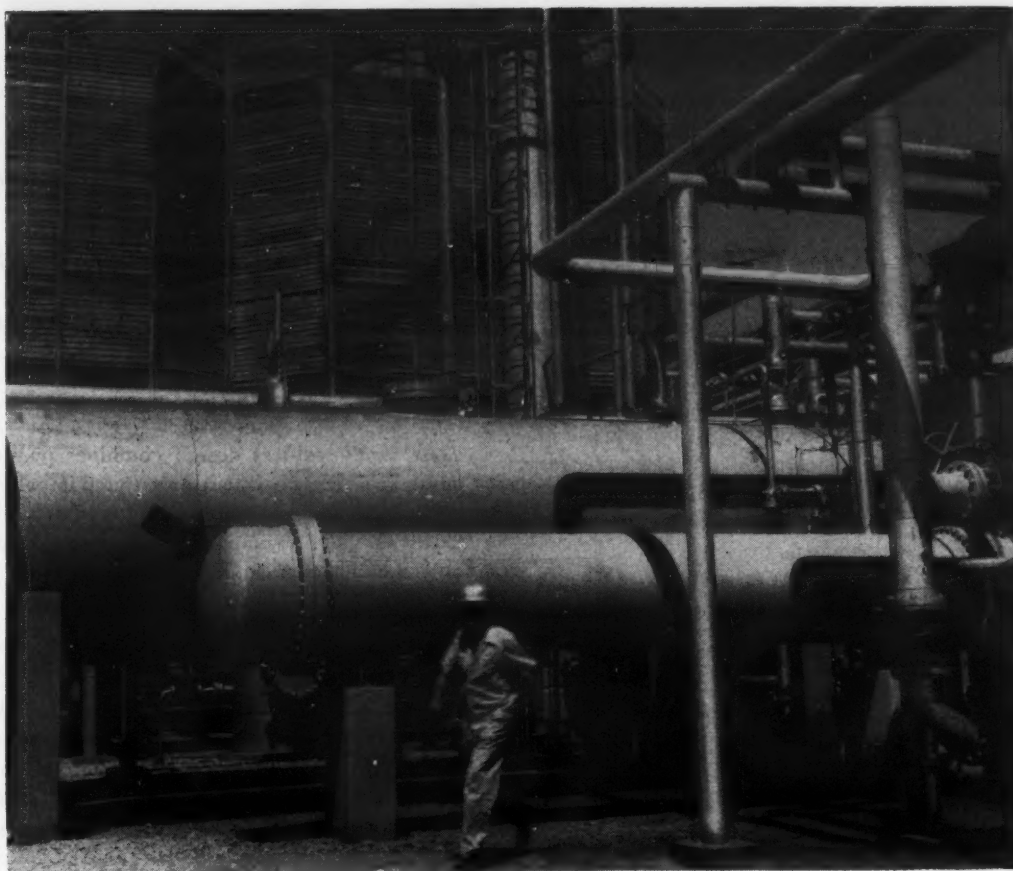
Latest devices for chain alignment control and lubrication.

Send for Folder Describing "National" Single and Multiple Apron Conveyor Dryers and Related Equipment

THE NATIONAL DRYING MACHINERY CO.
LENIGH AVENUE and HANCOCK STREET
PHILADELPHIA 33, PENNA.

New England Agents: JONES & HUNT, INC., Gloucester, Mass.
Cable Address: "NADRYMA" — W. U. Code

**processing
equipment**



One of bundles employing low-fin tube (arrow) in operation on oil-to-oil service

CP Staff Photo

Making it possible to remove four less efficient
fan coolers from service, two low-fin heat exchangers
in oil-to-oil service have —

32% higher heat transfer than design

Units improve operation of demethanizers by preheating feed while cooling lean oil from still base

Problem: Former method of operating two demethanizers with cold feed at a natural gasoline plant in the Midwest caused base of towers to be overloaded at times. Flashing was not occurring in upper sections of tower. Methane had a tendency to come down to base and flash, causing tower to carry over. Cold feed also made it necessary to use excessive heat for operation of tower.

GORDON WEYERMULLER, Associate Editor

When inquiring check 9522 opposite last page

Imp
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Soluti
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Lean
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Press

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Rich
Inlet
Outlet
Press

Heat d
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effici

DEC



Improvement in heat transfer is made possible by the greater surface area provided by the 1/16" high fins on the tube

Solution: In May 1955, one heat exchanger using integral, low-fin tube, known as Trufin®, was placed in operation on each of the two demethanizers. These exchangers are used to lower the temperature of lean oil from still base and to increase temperature of feed to demethanizer. Lean oil is on the shell side. Lean oil enters exchanger at 50 psi and feed at 285 psi.

Each exchanger is a 36" diameter x 20' long floating head unit, having 10,800 sq ft of finned heat exchange surface. Exchangers are two-shell pass, two-tube pass units, providing true counter-current flow.

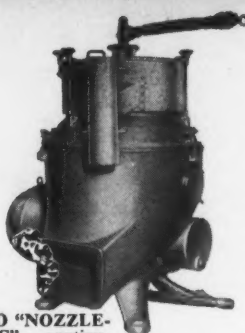
Inhibited admiralty tubes used in exchangers are 3/4" in diameter with 19 helical fins per inch. Tubes are on 15/16" triangular pitch. The 1/16" high fins are formed by extrusion from thick-walled tube. Extrusion process produces a smooth fin without any sharp angles or crevices. Ends of the tube are left without any fins and are designed so they can be easily substituted for plain tube in an existing installation.

Tube is called "integral finned tube" since the fins are a part of the tube itself. This eliminates

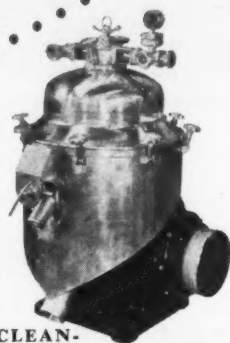
(Please turn to page 142)

Operational Test Data Fin-tube heat exchanger (north unit)

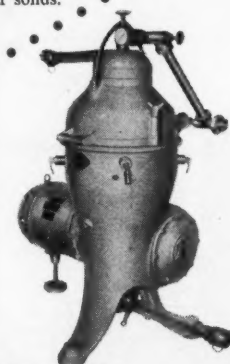
| | Design | Operation |
|---|------------|---------------|
| Shell side | | |
| Lean oil flow, lb/hr | 342,000 | 444,000 |
| Inlet temp, °F | 290 | 314 |
| Outlet temp, °F | 160 | 160 |
| Pressure drop, psi | 6.5 | not available |
| Tube side | | |
| Rich oil flow (feed), lb/hr | 337,000 | 386,000 |
| Inlet temp, °F | 100 | 84 |
| Outlet temp, °F | 230 | 246 |
| Pressure drop, psi | 3 | not available |
| Heat duty — Btu/hr (based on lean oil flow) | 24,300,000 | 38,300,000 |
| Log mean temp. difference (°F) | 60 | 72 |
| Overall heat transfer coefficient (Btu/hr/ft²/°F) | 37.4 | 49.3 |



AC-VO "NOZZLE-MATIC"...continuously separates or clarifies liquid-liquid-solid and liquid-solid mixtures—with heavy solids content—at high capacities.



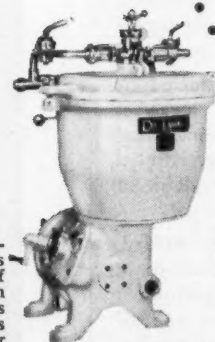
"SELF-CLEANING" CENTRIFUGE...discharges solids at short intervals at full speed... external control provides concentrated recovery of solids.



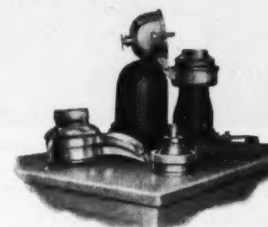
HERMETIC CENTRIFUGE... operates under positive pressure. Mixtures separated or clarified without agitation... no contact with or entrainment of air.



MULTIPLE CLARIFIER... double-bowl construction. Effectively clarifies liquids with constant efficiency throughout entire run.



TYPE K CLARIFIER... handles high capacities of multiple clarification—up to 2,600 gallons per hour... solids holding space, over 17 gals.



GYRO-TESTER... for laboratory and pilot plant... combining high speed test tube centrifuge... continuous, constant efficiency centrifuge... will break most emulsions readily... makes basic determinations with high accuracy.

To insure product quality
and uniformity...eliminate stop-and-go
production...cut processing time
...break bottlenecks...or solve chemical
processing problems of any size...
specify De Laval Centrifugals
field-proven in major chemical
plants all over the nation!



THE DE LAVAL SEPARATOR COMPANY Poughkeepsie, New York • 427 Randolph St., Chicago 6
DE LAVAL PACIFIC CO. 201 E. Millbrae Ave., Millbrae, Calif.

When inquiring check 9523 opposite last page

PROCESSING

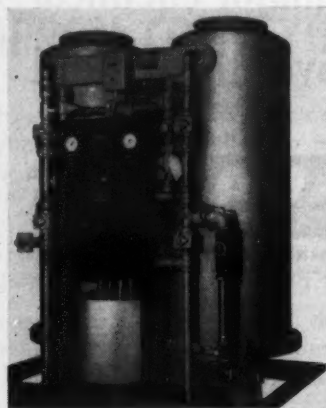
Automatic regeneration featured on 2500 gal per hr demineralizer . . .

flip of switch starts cycle —
includes rinsing, re-starting
effluent flow

Uses: Purifying water for industrial purposes.

Features: Packaged unit is ready for operation upon connection to service lines. Demineralizer has automatic regeneration system and can deliver up to 2500 gph of less than 2 ppm water.

Description: Unit operates on dual column ion exchange principles, having individual columns for the cation and anion resins.

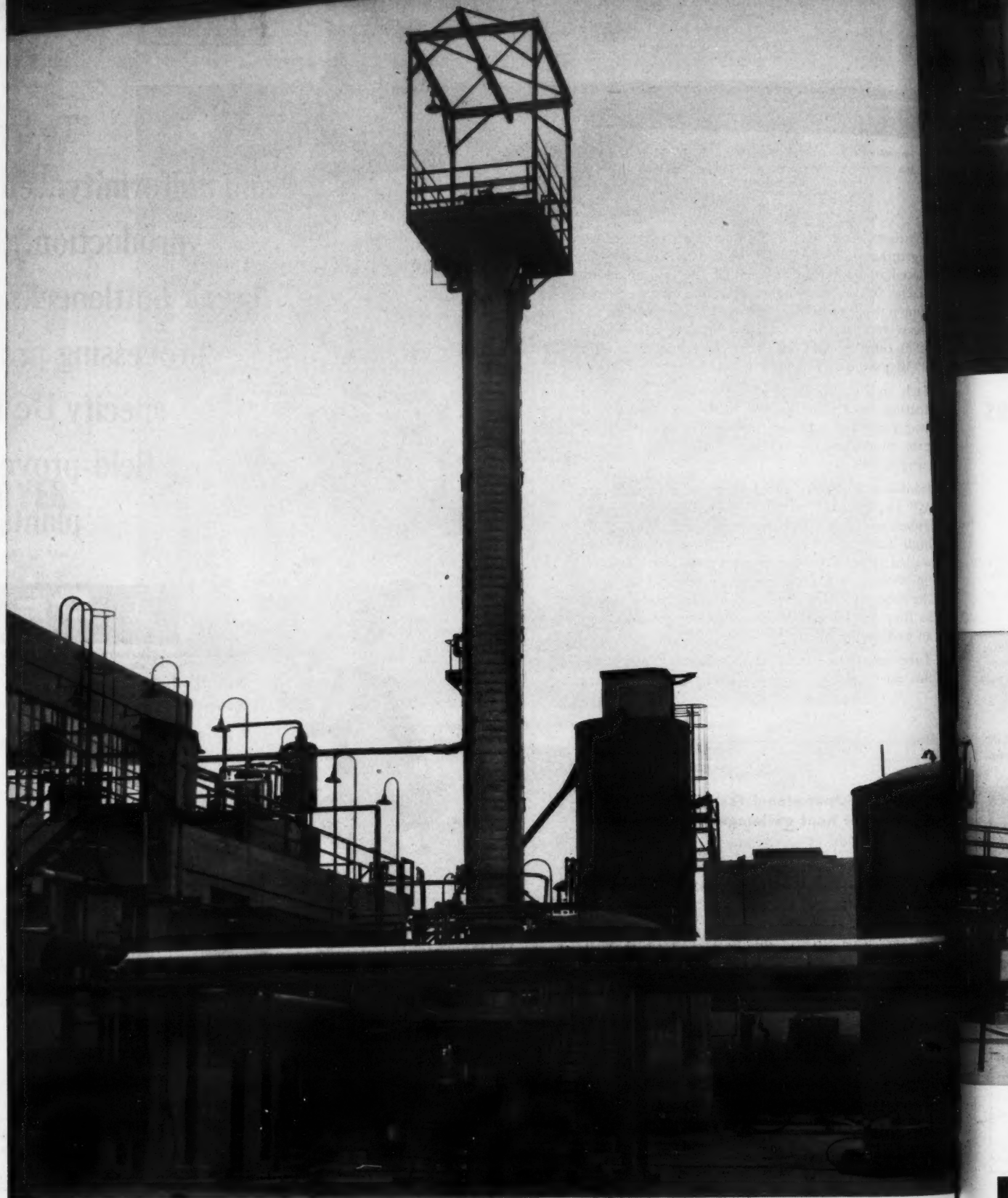


Packaged demineralizer is ready for operation — needs only to be connected to service lines

All operating functions are automatic. When effluent's purity falls below desired standard, unit automatically stops delivering water and signals need for regeneration.

Regeneration cycle is started by flip of a switch. Cycle completes itself automatically, including rinsing and re-starting effluent flow when pre-set standard of purity is attained.

Resin columns are butt welded, made of rolled steel. Underdrain system consists of perforated stainless steel plate on top of which a plastic screen rests. Regenerant piping includes corrosion resistant eductors, valves,



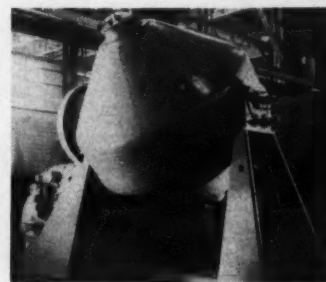
The fat splitter is 65 feet high. It is lined with 7/64" Stainless Steel.

and plastic draw-up lines for both acid and caustic regenerants. Process piping is made of stainless, bronze, and plastic.

(Model ULA-2500 demineralizer is made by Penfield Manufacturing Co., Dept. CP, 19 High School Avenue, Meriden, Conn. . . . or for more information check 9524 on form which is located opposite last page.)

Giant dryer-blender weighs 20,000 lb when full

"King-sized" glassed-steel conical dryer-blender is being marketed having an 8-ft. diam. It weighs about 20,000 lb when fully charged. Internal pressures range from full vacuum to 20 psi. The unit can remove moisture down to 0.01%.



Glassed-steel conical dryer-blender has 8-ft diam

Just like its smaller brothers, the big dryer can be used for every acid except hydrofluoric and for alkalis up to pH 12 at 212°F. In operation, the unit revolves slowly to provide rapid drying and blending. Teflon envelope gaskets are used on openings.

(Conical dryer-blenders are product of The Pfaudler Co., Dept. CP, 1019 West Avenue, Rochester, New York . . . or for more information check 9525 on form located opposite last page.)

For more information on product at left, specify 9526 . . . see information request blank opposite last page.

Here are six of the many Stainless Steel pumps used in the distillation unit.

TAKE A TIP FROM ARMOUR—

**use USS Stainless Steel
to protect the color of your product**

The pictures were taken at McCook, Illinois, at a Chemical Division plant of Armour and Company. Here, fatty acids and fatty chemical derivatives are produced from such raw materials as tallow, coconut oil and cotton seed oil.

All piping and most of the pumps are made from Stainless Steel. The fat splitter, distillation columns, dryer, distilling vessels, water cooler and reactor tubes are also made from Stainless; and there are countless other places where this valuable metal is used, too.

We talked to Robert J. Cotten, Assistant to the Master Mechanic, and he said, "If we used any other metal but Stainless Steel, it would discolor our end products—an intolerable situation for Armour and Company. But there's another point to consider, too. All of the Stainless we installed in 1949 is still in excellent condition. If we had used mild steel, we'd have replaced it 20 times by now."

Nothing can equal Stainless Steel in its combination of useful properties: corrosion resistance, no product contamination, cleanability and resistance to elevated temperatures. And when you buy, be sure of service tested quality—specify USS Stainless Steel.

◀ In the solvent crystallization plant Stainless is used for heat exchangers, chiller filter and other equipment.

UNITED STATES STEEL CORPORATION, PITTSBURGH • AMERICAN STEEL & WIRE DIVISION, CLEVELAND • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
NATIONAL TUBE DIVISION, PITTSBURGH • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. • UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS STAINLESS STEEL



SHEETS • STRIP • PLATES • BARS • BILLETS • PIPE • TUBES • WIRE • SPECIAL SECTIONS

6-1228

FROM THIS

TO THIS

IN 60 SECONDS!

Whether you are mixing granular or pulverized, wet or dry materials, Readco's counterflow action spiral ribbon mixers will provide a thorough mix in less time and without material build-up at the bowl ends. These sturdy mixers are built for continuous or batch processing. They can be supplied for pressure or vacuum service, with or without temperature controlling jackets and in working capacities from 1 to 500 cubic feet. Readco also manufactures a complete line of double arm mixers, including laboratory and pilot plant models, vertical mixers and materials handling equipment. Modern laboratory facilities are available to assist you in determining the proper equipment to suit your needs. Write for complete details.



BAKERY-CHEMICAL DIVISION
YORK, PENNSYLVANIA

READ STANDARD
CORPORATION

When inquiring check 9527 opposite last page

PROCESSING EQUIPMENT

Higher Heat Transfer

(Continued from page 139)

any possibility of a "fin joint efficiency loss" or of the fins breaking loose from tube wall. A $\frac{3}{4}$ " finned tube has about $2\frac{1}{2}$ times the outside surface area as that of a $\frac{3}{4}$ " plain tube, which makes improved heat transfer possible.

Results: An operational test run on one of the fin-tube exchangers at the plant showed a 32% increase in overall heat transfer coefficient over design. As can be seen from table, the higher heat transfer coefficient allowed more lean oil and more rich oil to be put through unit. Addition of the two fin-tube exchangers made it possible to remove from operation four air-cooled units, which had been used for cooling the lean oil.

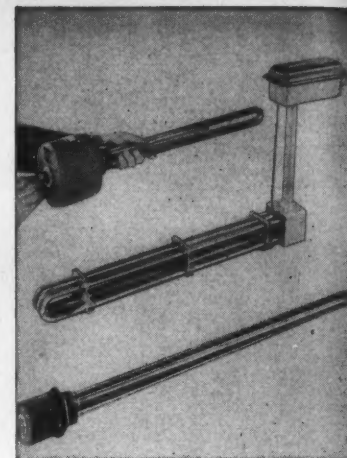
Operation of the demethanizers has been considerably improved since former overloading of the base of tower has been eliminated. No maintenance has been necessary on exchangers since they were placed in service. No trouble has been experienced with clogging.

(Wolverine Trufin, the integral finned tube, is a product of Wolverine Tube, Div. of Calumet & Hecla, Guardian Towers, Guardian Bldg., Detroit 26, Mich. . . or for more information check 9528 on form opposite last page.)

(Heat exchangers using finned tube were designed and fabricated by Heat Exchanger Div., Western Supply Company, Dept. CP, 400 N. Boulder Street, Tulsa, Oklahoma . . . or for more information check 9529 on form opposite last page.)



"Perhaps, sir, our economy model will suit your needs."



CHROMALOX Electric IMMERSION HEATERS

with or without
built-in thermostats
... fit the heat to your need
up to 100,000 watts
and 2,500 psi

Full range of sizes and ratings in portable, screw-plug and flanged types. Available with copper, steel or alloy sheaths to resist corrosion.

Used for heating water, asphalt, greases, molten salts, pickling and plating baths, process kettles; for superheating steam and compressed air; for melting lead, solder, babbitt; and for a wide range of similar applications.

Let the Chromalox Sales-Engineering staff solve your heating problems . . . electrically.

Write for your copy of
Catalog 50

—for full information on the complete line of Chromalox Electric Heaters and controls.

For ideas on additional applications of electric heat, request Booklet F1550—"101 Ways to Apply Electric Heat."

Edwin L. Wiegand Company
7517 Thomas Boulevard, Pittsburgh 8, Pennsylvania

EDWIN L. WIEGAND COMPANY
7517 Thomas Boulevard, Pittsburgh 8, Pa.
I would like to have . . .
☐ a copy of Catalog 50
☐ a copy of "101 Ways"
☐ a Sales-Engineer contact me.

Name _____
Company _____
Street _____
City _____ Zone _____ State _____

A-4467A

When inquiring check 9530
opposite last page

CHEMICAL PROCESSING

143

There's more to filtration than

$$\frac{dV}{Ad\theta} = \frac{S_c \times \Delta p}{(aW/A + R_m)\mu}$$

Filtrate volume, pressure drop, cake weight, viscosity—these are a few of the variables in this basic equation for cake filtration.

None of these factors can be ignored, any more than the many variables can be overlooked in the selection of a filter fabric.

Fiber, yarn number, crimp, twist, weave, porosity and other qualities must be calculated and considered before a filter fabric can be selected for a specific filtration job.

That's why you should make fullest possible use of the people who engineer and distribute filter fabrics.

If you have a particularly knotty filtration problem, call us. A wide range of cotton and synthetic fabrics in many constructions is available for your requirements. Make use of Wellington Sears' century of experience in industrial fabrics, and the practical knowledge of our specialist-distributors.

We are all ready to serve you. For free copy of illustrated booklet,

"Filter Fabric Facts," write Dept. M-12.

Wellington Sears

FIRST In Fabrics For Industry

Wellington Sears Company,
65 Worth Street, New York 13, N. Y.



Offices in: Atlanta • Boston • Chicago • Dallas • Detroit • Los Angeles • Philadelphia • San Francisco • St. Louis

When inquiring check 9533 opposite last page

PROCESSING EQUIPMENT

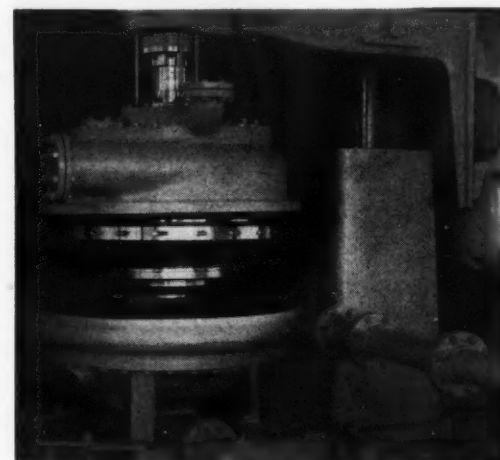
Pressure centrifuge can handle 100 psi, 300°F solutions at 250 gpm

Unit cuts overall processing time by eliminating need for prior cooling, reduction in pressure

Uses: Concentrating, separating, clarifying, or washing liquid-solid mixtures at elevated pressures and temperatures.

Features: Unit is designed for operating in the 100 psi and 300°F range. Machine makes it possible to substantially reduce processing time by being able to handle hot materials directly, without need of cooling to conventional temperatures or reducing to atmospheric pressure.

Description: Centrifuge is a continuous high-speed, bowl-type unit, having a specially-designed housing closure which permits operating at relatively high internal pressure. Internal recycle system



Upper housing of pressurized centrifuge is raised by compressed air-operated hoist assembly. Rotor has 30" diam, is made of stainless steel

permits close control of underflow concentration and washing. Feed, wash, product discharge rate, and rotor speed can also be adjusted.

Units are available in two sizes. Small model (PC-9) has 9" diam rotor, develops centrifugal force as high as 9500 g's, and can handle from 1 to 20 gpm. Production model (PC-30) is equipped with 30" rotor. It will handle 90 to 250 gpm, rotor developing 4000 g's. Standard materials of construction are stainless steel rotor and cast iron housing.

(Merco pressure centrifuges are product of Dorr-Oliver Incorporated, Dept. CP, Barry Place, Stamford, Conn. Check 9534 opposite last page.)

CHEMICAL PROCESSING

Rubber-molded filter leaves resist oil, grease, acid, heat

Filter leaves molded from Hycar American rubber, a raw material supplied by B. F. Goodrich Chemical Company, Cleveland, Ohio, are proving their worth in various applications. Used for filtering both corrosive and non-



Rubber-molded filter leaves are rugged, can be used in variety of filtering applications

corrosive liquids, the leaves resist heat oil, grease, and acids, and are available in sizes ranging from 6x12" to 30x48". Ruggedly constructed, the units can be used to support nylon, cotton, paper, and similar filtering materials.

(Rubber-molded filter leaves are manufactured by Industrial Filter & Pump Mfg. Co., Dept. CP, 5900 W. Ogden Avenue, Chicago 50, Ill. Check 9535 on form opposite last page.)

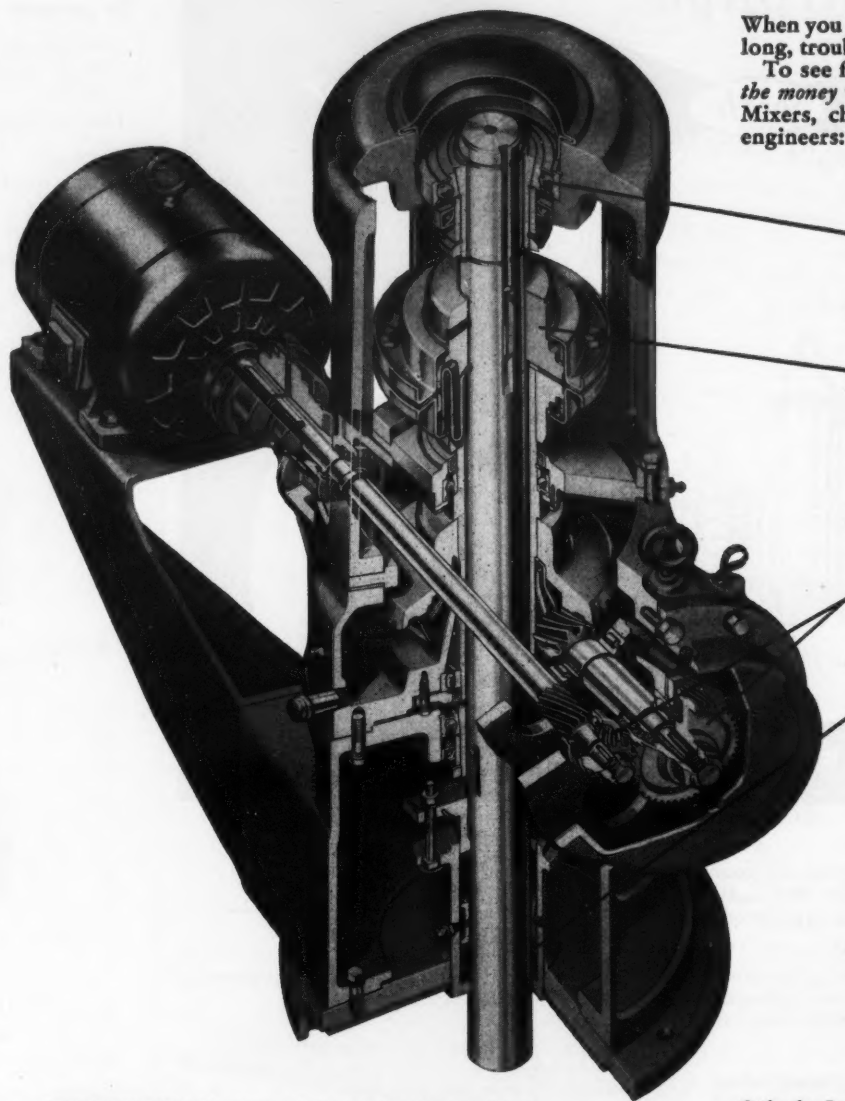
Fin-tube heat exchanger

Assembly, maintenance, and operation features of fin-tube heat exchangers described in two-color, eight-page bulletin. Included are table of dimensions, type designation table, and fin-side coefficient and pressure-drop charts.

Bul FH-3 is issued by ALCO Products, Incorporated, Dept. CP, P. O. Box 1065, Schenectady, N. Y. When inquiring specify 9536 opp. last page.

For more information on product at right, specify 9537 . . . see information request blank opposite last page

Get these extra years of fluid mixing built into every Lightnin Mixer you buy



When you buy a mixer for fluids, you're banking on long, trouble-free service. Are you getting it?

To see five specific ways you get *more mixing for the money* when you specify turbine-type LIGHTNIN Mixers, check these practical questions asked by engineers:

1. Can I remove and replace the mixer shaft easily? Yes. You can remove a LIGHTNIN Mixer shaft upward or downward, easily and safely. This adapter-type fixed bearing assembly grips and centers the mixer shaft, realigning it accurately when you replace the shaft.
2. What if the impeller accidentally whacks something in the tank? Are gears protected? Gears are fully protected. This flexible coupling absorbs normal and abnormal shaft flexures. Coupling acts as a mechanical "fuse" between the mixer shaft and hollow drive quill. Mixer shaft is suspended on separate ball bearings independent of the speed reducer. The quill surrounds the shaft like a sleeve, but does not touch it. Shock loads on the shaft can never reach the gears.
3. Can I change mixing speed later if process requires it? Yes—provided the new speed doesn't increase mixing load beyond the mixer's rated capacity. These change gears permit quick, simple interchange of as many as 16 standard speeds, from 16.5 to 420 RPM.
4. How can I cut cost of pressure or vacuum mixing? Two ways. This easy-to-service stuffing box runs longer between packing changes, because it's integral with the mixer mounting flange—aligned as a unit with the shaft bearings for true, steady running. And now, you can end stuffing-box maintenance for good—with the easy-to-change LIGHTNIN rotary mechanical seal. The seal, not shown here, takes the place of a stuffing box. It stops leakage, runs for years without adjustment. Yet you can replace it in minutes if you ever need to—without dismantling the mixer, without need for special skills.
5. Can I change this mixer from one tank to another without costly special construction? Certainly. You can switch a LIGHTNIN from open-tank to closed-tank mounting, from top entering to bottom entering, and vice versa, and adapt it for low-headroom installation. You can make any of these changes using standard stock components.

Only the LIGHTNIN drive gives you flexibility like this, to keep your mixing costs low over the years.

And every LIGHTNIN Mixer you buy is guaranteed, unconditionally, to do the mixing job for which it is recommended. Ask your LIGHTNIN representative (listed in Chemical Engineering Catalog) to explain how you can get extra years of fluid mixing, at low mixing cost. Or ask us by mail.

HERE'S JUST ONE of several hundred standard power-speed combinations you can buy in Series "E" LIGHTNIN Mixers. This double reduction assembly provides up to 8 interchangeable mixing speeds, from 68 to 280 RPM. It converts easily to single or triple reduction for a total range of 16 standard speeds.

"Lightnin' Mixers"
MIXCO fluid mixing specialists

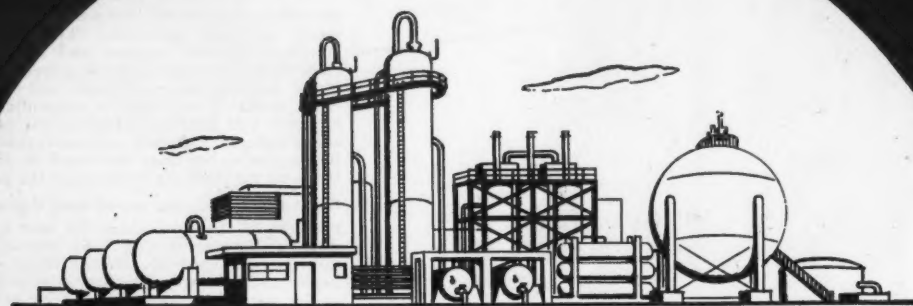
FOR LATEST MIXING INFORMATION and full description of LIGHTNIN Mixers, send for these helpful bulletins:

- | | | |
|--|--|--|
| <input type="checkbox"/> B-102 Top or bottom entering; turbine, paddle, and propeller types: 1 to 500 HP | <input type="checkbox"/> B-104 Side entering: 1 to 25 HP | <input type="checkbox"/> B-111 Quick-change rotary mechanical seals for pressure and vacuum mixing |
| <input type="checkbox"/> B-103 Top entering; propeller types: 1/4 to 3 HP | <input type="checkbox"/> B-112 Laboratory and small-batch production types | <input type="checkbox"/> B-107 Data sheet for figuring mixer requirements |
| <input type="checkbox"/> B-108 Portable: 1/4 to 3 HP | <input type="checkbox"/> B-109 Condensed catalog showing all types | |

Check, clip, and mail with your name, title, company address to:

MIXING EQUIPMENT Co., Inc., 185-n Mt. Road Blvd., Rochester 11, N. Y.
In Canada: Greer Mixing Equipment, Ltd., Toronto 10, Ont.

advances in the Chemical Industry through progress *with* Proctor



YOU CAN SHARE IN THIS PROGRESS

PROFIT by PROCTOR's careful analysis of your drying problem—actual test runs establish the optimum drying conditions for highest quality and product uniformity.

PROFIT by PROCTOR's five decades in the creation and design of drying systems—by the low operating cost resulting from Proctor's ability to accurately convert test results into full scale performance.

PROFIT by PROCTOR's up-to-the-minute shop and manufacturing techniques—by the ruggedness and dependability built into every Proctor product, giving true value for every dollar.

PROFIT by PROCTOR's record of progress over the years—a record of the satisfaction and confidence of the many Proctor customers.

PROFIT by PROCTOR's policy of GUARANTEED performance.

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PHILADELPHIA 20, PA.

Manufacturers of Industrial Drying Equipment and Textile Machinery

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| 1900 | TRAY TRUCK DRYERS |
| 1923 | JOB-ENGINEERED CONTINUOUS CONVEYOR DRYERS |
| 1923 | CHEMICAL LOOP DRYERS |
| 1934 | FIN DRUM FEED |
| 1937 | GRANULATOR |
| 1938 | ROLLING EXTRUDER |
| 1938 | SCORING ON FILTER |
| 1953 | SPRAY DRYERS |



When inquiring check 9538 opposite last page

PROCESSING EQUIPMENT

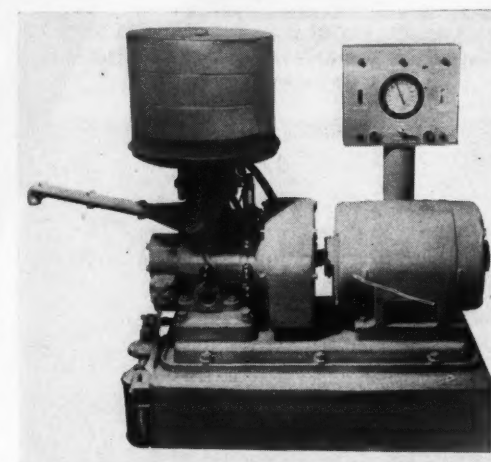
Liquid air, gases produced at the touch of a button in compact unit . . .

machine has capacity of five quarts liquid air per hour, is 37" long, 20" wide, 34" high

Uses: Liquefying air or other gases.

Features: Compact, efficient unit produces liquid air at the touch of a button in a matter of minutes. Capacity of machine is up to five quarts of liquid air per hour. Liquefier is only 37" long, 20" wide, and 34" high.

Description: Unit operates on gas refrigeration cycle, using helium as refrigerant. Air or gases to be liquefied do not pass through the interior mechanism of the machine. Instead they enter a chamber surrounding the helium cylinder at normal atmospheric pressure, condensing on the cold



Liquefier uses helium as refrigerant, produces oil-free, high purity product

surface of the cylinder until the quantity is large enough to be run off. System provides an oil-free, high purity product.

Machine consists of a single cylinder containing two pistons, properly phased and actuated from two throws on the same crankshaft. Rod for the upper piston (called the displacer) slides through the center of the lower piston and the crankshaft is so arranged that a phase difference of less than 90° is maintained.

At one point of the cycle, the lower piston and the displacer come close together, compressing the gas between them. As the helium is compressed, the displacer moves downward to enlarge the chamber above it. At the proper moment, the compressed helium is forced out of the compression chamber through a regenerator and into the expansion chamber where cooling takes place. Next, due to the phasing of the piston and displacer, volume of the compression chamber is increased and the

CHEMICAL PROCESSING

expansion chamber volume decreased. Thus, the helium moves back to the compression chamber without being compressed.

Unit is driven by a 10-hp electric motor. Before going into operation, helium is supplied to the system until the static internal pressure reaches about 225 psi. When motor is in operation, internal pressure reaches an average of 310 psi. Machine stops automatically if helium pressure exceeds 375 psi or falls below 220 psi. Water for cooling 3 to 4 gpm is obtained from city water systems or from a conjunctive cooler. Unit stops automatically if water pressure drops excessively.

Degree of cold produced by machine ranges from -80° to -200°C . Under normal conditions of humidity or in air conditioned rooms, unit can operate 23 hours out of 24, allowing for defrosting. Liquefier is mounted on a concrete slab 37" long, 20" wide, and 23" high which rests on heavy rubber supports. The machine weighs 660 lb.

(Norelco gas liquefier is product of Instruments Division, North American Philips Company, Inc., Dept. CP, 750 South Fulton Avenue, Mount Vernon, N. Y. . . . or for more information reader may simply check 9539 on the Reader Service slip which is located opposite last page.)



"Think you can handle it?"

Out of the Engineer's Workbook

REINEVELD
CONTINUOUS CENTRIPLANES
Solids Capacities on Typical Slurries - lbs. per hr.

| PRODUCT | FRAME SIZE | | SURFACE MOISTURE |
|-------------------------------|------------|--------|------------------|
| | 17" | 25" | |
| $(\text{NH}_4)_2 \text{SO}_4$ | 5,500 | 10,500 | 1.3% |
| $\text{Na}_2 \text{SO}_4$ | 5,100 | 9,500 | 3.0% |
| Na Cl (COARSE) | 9,500 | 19,000 | 2.0% |
| P.V.C. (FINE) | 7,500 | 14,000 | 5.0% |
| K Cl | 8,400 | 16,000 | 4.0% |
| Corn Fibers | 3,500 | 6,000 | 24.0% |



25" REINEVELD Continuous Centriplane

Heyl & Patterson is proud to offer the Reineveld Continuous Centriplane to the Chemical Processing industry where continuity of operation is rapidly becoming a standard.

A pilot plant Reineveld Continuous Centriplane is available for testing in your plant.

For further information, contact your Heyl & Patterson Sales Engineer, or send for bulletin RC-356.

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When inquiring check 9540 opposite last page

PICK THE RIGHT FAN NOW

—and have no regrets later

PROCESSING EQUIPMENT

Tells about vertical plate filter press design

Engineering data and specification table in four-page, two-color bulletin provide information about vertical plate and frame liquid clarifying filters. Operating procedures are given. Drawing shows flow through unit; other illustrations reveal how parts fit together.

Bul 20 is issued by Brosites Products Corporation, Dept. CP, 50 Church St., New York 7, N.Y. Specify 9542 opposite last page.

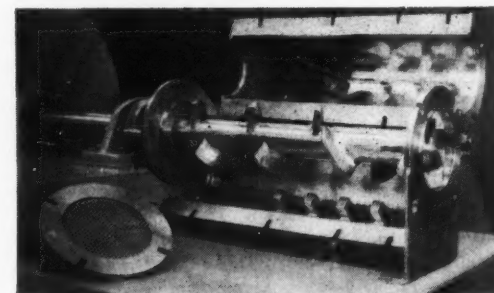
Dry materials, liquids mixed quickly in continuous mixer-extruder . . .

product is discharged through orifice plate in convenient-to-handle form

Uses: Mixing dry materials with liquid ingredients.

Features: Machine operates continuously. Product is discharged through orifice plate in convenient-to-handle spaghetti or pellet form. Wide selection of orifice plates makes it possible to turn out products in various shapes and sizes.

Description: Machine is simply designed, ruggedly constructed, and easy to clean. Mixing and forward pressure are accomplished by interrupted screw system (see photo) which carries materials through any selected extension head or orifice plate. Available in different sizes and various materials of construction, small version of unit can handle up to 2000 lb per hr.



Mixing and forward pressure are accomplished by interrupted screw system. Orifice plate (left) fits onto discharge end (right)

Unit has already found applications in number of fields. It is successfully extruding pharmaceutical formulations for granulating at production rates of 500 to 1200 lb per hr through a 3/16" diam orifice, utilizing only 3-5 hp. Another use is with asphaltic materials. Operating at 600 rpm and extruding through a 1/4" orifice, machine is achieving good results at high capacity in continuous mixing of heavy, pasty bitumastic compounds.

CHEMICAL PROCESSING

"BUFFALO" FAN

APPLICATIONS

CHARACTERISTICS



Type BL Fan

Supplying large ventilation, air conditioning and air cleaning systems. Type BL is used in Class I service, while Type BLH is designed for Class II-IV (high pressure) service. Write for BL Bulletin F-101 and BLH Bulletin F-200.

Extremely quiet and high in efficiency; stable performance from zero pressure to shutoff; non-overloading regardless of system pressure; available in capacities up to 500,000 cfm, all drive arrangements and discharge angles.



Type CR Fan

New "Buffalo" Radial Blade Fan for severe industrial services such as handling abrasive dust-laden air and economical mechanical draft. The CR's high capacity, high pressure characteristics often mean a smaller fan for the job. Write for Bulletin FD-205.

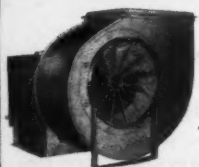
Mechanical efficiency above 78% over a broad range—high volume, high pressure characteristics, also high resistance to abrasion. Long life under severe conditions. An economical fan to own and operate.



Package Propeller Fans

For wall or window-mounted ventilation and exhaust; capacities from 500 to 250,000 cfm. Available in non-sparking, high temperature and corrosion-resistant models, also package roof ventilators. Write for Bulletins FM 1234 and FM 2345.

Husky, die-stamped blades and frame. Proven unusually high in efficiency in hundreds of installations. Compact, easy to install packages for economical ventilation of a single room or a whole building.



Belted Vent Sets

For zone ventilation where quiet and flexibility are required. Capacities from 1000 to 20,000 cfm. Write for Bulletin 3720.

Efficient, quiet, non-overloading. Simple package installation, indoors or out. Capacity adjustable by changing sheaves.



Industrial Exhausters

Moving materials or exhausting fumes, mists, dust; available with heat slinger for temperatures up to 1000° F. Write for Bulletin 3576.

Heavy all-welded steel plate for strength, smooth interior surfaces for minimum friction. Interchangeable Air Wheels or Material Wheels.

BUFFALO FORGE COMPANY

BUFFALO, NEW YORK

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.



VENTILATING AIR CLEANING AIR TEMPERING INDUCED DRAFT EXHAUSTING FORCED DRAFT COOLING HEATING PRESSURE BLOWING

When inquiring check 9541 opposite last page

PROCESSING EQUIPMENT

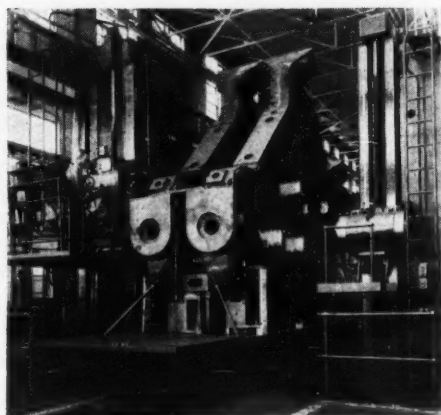
Device is also being tested on a multitude of other products ranging from toothpaste to rubber. Manufacturer performs test work at no charge on any application or problem that involves possible use of the machine.

(Mastigrator is product of Rietz Manufacturing Company, Dept. CP, Santa Rosa, California . . . or check 9543 on form opposite last page.)

Tells how water filtration cuts production costs

Cut-away sections and other drawings in 10-page bulletin show operation of water filter. Dimension charts and flow curves are given for different sizes of filters and types of elements. Installation photographs show uses of filter equipment.

Bul 909 is issued by R. P. Adams Company, Inc., Dept. CP, Buffalo 17, N. Y. When inquiring specify 9544 opposite last page.



Adding a new twist to calendaring

A departure from conventional design, the pair of calendar frames shown above on a Sellers 8"-bar horizontal boring mill, will be used to support four 32 x 86" rolls in an inclined Z arrangement instead of the normal horizontal set-up. The rolls, while retaining the conventional Z formation in relation to one another, will, when inclined as an assembly, permit easier access to the rolls, facilitate threading, make possible the mounting of auxiliary equipment closer to the rolls, and simplify maintenance. The frames, each weighing 40 tons, are shown lying on their front sides.

(Calendar was designed by Farrel-Birmingham Company, Inc., Dept. CP, Ansonia, Conn. . . . or for more information check 9545 on form opposite last page.)

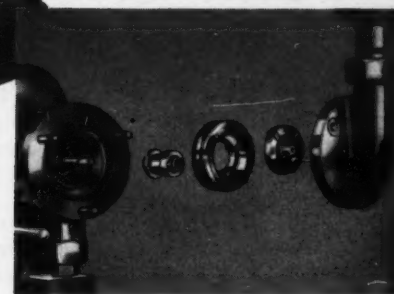
NEW!

GAULIN RE* COLLOID MILL



This is the Model 2A. It is shown with accessory equipment — stainless steel 3-way valve, by-pass tubing and tank — for processing quantities as small as 8 oz. Extremely useful for laboratory and research work, it is also designed for production work within its capacity range. Mill body is water jacketed for either heating or cooling.

The Special PLUS Features of the Gaulin RE*



Exclusive! Removable rotor, stator and shaft seal can be disassembled without tools. Shaft leakage is eliminated — There is positive sealing even when processing volatile organic liquids.



Special micrometer adjustment — from .001 to .040 — accurately positions the gap opening between rotor and stator. Adjustment of opening can be made at any time whether machine is running or not — allowing continuous control of processing operation.

Here's a brand new concept in Colloid Mills — the Gaulin RE* with removable rotor, stator and shaft seal. The horizontal two-stage design gives maximum capacity per horsepower and unusual processing efficiency. Result: The Gaulin RE* Colloid Mill greatly simplifies operation, can be cleaned without tools, has minimum maintenance, positive shaft sealing and greater production per dollar invested.

Special Materials Available

Rotor and stator can be furnished in stainless steel, tungsten carbide, ceramic, alundum and other special materials. Removable feature makes parts interchangeable.

Wide Range of Capacities

The Gaulin RE* has a capacity range from 0-2600 gph. Model 2A: 0-310 gph; Model 4A: 0-1000 gph; and Model 8A: 0-2,600 — all depending on product, specifications and gap setting.

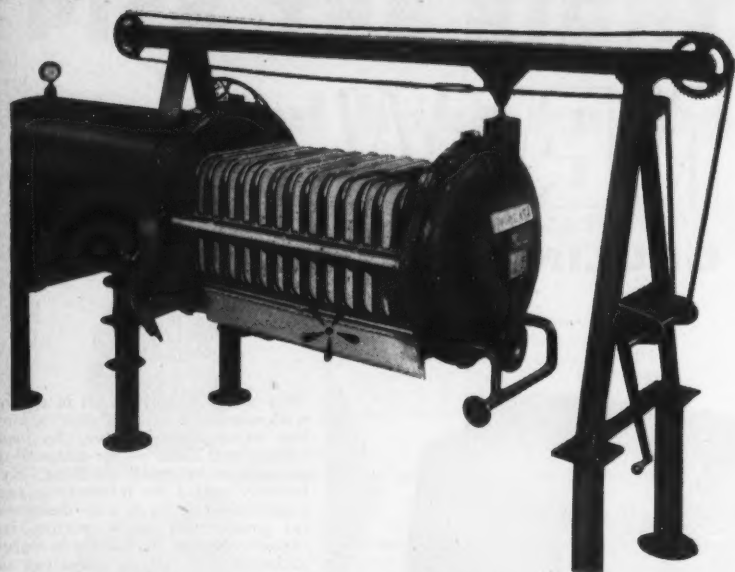
Send for New Bulletin

Put this new Colloid Mill to work for you! Complete data on the RE* line is available in a special bulletin. Construction details, capacity data for typical products, and rating curves are included. Ask for C-56 from: The Manton-Gaulin Mfg. Co., Inc., 55 Garden Street, Everett 49, Mass.



*patent applied for

When inquiring check 9546 opposite last page



Eliminates 99% of heel

* Niagara Pressure Leaf Filters with new scavenger leaves eliminate unfiltered liquid heel left in the filter tank to 1% or less. Accordingly, no heel need be held for the next cycle. Two scavenger leaves retract from the tank with the leaf carriage . . . swing down into a vertical position for easy cake removal . . . out of the way of cake that drops from the main leaves.

CUT DOWNTIME—To remove cake from the main and scavenger leaves, the operator simply shakes or taps them; cake falls into a hopper. For the great majority of applications, the all-metal leaves require no fabric covers. One man can drain, open, clean, fill and precoat in minutes . . . not hours. Sharply cutting downtime this way—plus greater flow rates—can easily increase your filtration efficiency as much as 400% over cloth-covered presses.

MAIL COUPON TODAY

Niagara FILTERS

A DIVISION OF
American Machine and Metals, Inc.
Dept. CP-1256 EAST MOLINE, ILLINOIS

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☐ Send free Catalog NC-1-33. ☐ Have representative call.

NAME AND TITLE

COMPANY

ADDRESS

CITY

ZONE

STATE

SPECIALISTS IN LIQUID-SOLIDS SEPARATION

When inquiring check 9547 opposite last page

briefs

Pesticide liability

Whether or not manufacturers of pesticides are held strictly liable for events that arise from the use of their products depends on adequacy of testing and directions for use of the compounded material. Three pages, one photograph. ("Journal of Agricultural and Food Chemistry," August 1956, page 680.)

Preventive maintenance

Adapted from the forthcoming Maintenance Engineering Handbook, this paper deals with preventive maintenance under headings of why industry needs preventive maintenance, strengthening the program, what to inspect for, how often to inspect, effective procedures, and aids. Twenty-one pages. ("Factory Management and Maintenance," September 1956, page 116.)

Extraction of lignin

Previous work on extraction of lignin with neutral solvents is summarized. A standard method is presented and a means of obtaining "milled wood lignin" is described. Nine pages, one table, six figures, 40 references. In English. ("Svensk Pappers Tidning," July 1956, page 477.)

Oxygen in steel

This paper covers the oxygen content of liquid Siemens-Martin steel during melting in various large heats. Relationships between temperature, content of slag and manganese in the melt, and content of dissolved oxygen in the steel are given. In German. Eight pages, one table, 19 figures, 11 references. ("Stahl und Eisen," September 1956, page 1161.)

Vacuum degassing

Study reveals the effects of vacuum degassing on mechanical properties of aluminum. Six pages, one table, eight figures, four references. ("Foundry," September 1956, page 118.)

Mixed polymer fibers

From England comes a discussion of preparation, properties, structure, and potentialities of fibers that contain acrylonitrile and cellulose. Five pages, four tables, three figures, two references. ("Fibres," July 1956, page 211.)

Cellulose lacquers

Condensations of eleven papers in the symposium "Significant Recent Developments in Cellulose Lacquers" are presented. Ten pages, two tables, three figures. ("Industrial and Engineering Chemistry," August 1956, page 1320.)

Emissivity of transparent materials

From first principles, transparent and opaque materials are compared with respect to emissivity. Applications to cooling of transparent sheets are presented briefly. Ten pages, eight figures, 11 references. ("Journal of the Ceramic Society," August 1956, page 278.)

Soap solutions

When electrolytes are added to aqueous solutions of potassium and sodium oleates, viscoelastic properties are observed as a result of a change of soap micelles from small

abstracts of pertinent articles in other industrial publications . . . selected by CP editors as a service to you . . .

detached spheres to interlinked cylinders. Four pages, two tables, three figures, 14 references. ("Journal of Physical Chemistry," June 1956, page 782.)

Two-bed deionization

Operation of a two-bed deionization plant is described. Difficulties, and experiences with anion resins are covered. Three pages, one table. ("Southern Power and Industries," September 1956, page 68.)

Industrial taxes

How Freeport Sulphur Company fought unfair industrial taxes is described. When the governor of Louisiana attacked with rhetoric, the company countered with facts. Three pages. ("Engineering and Mining Journal," September 1956, page 75.)

Flexible foam

Mechanical action of flexible foams is described under headings of fatigue testing, flammability, compression set, and fusion. Seven pages, two tables, 15 figures, three references. ("Modern Plastics," August 1956, page 139.)

White to gray tin

Transformation of white to gray tin is covered, properties of gray tin are presented, and attention is called to resemblances to germanium and silicon. Test results and data on rate of spread for a number of commercial tins are given. Six pages, 12 tables, seven figures, five references. ("Chemistry in Canada," August 1956, page 29.)

Waste treatment

Handling and treatment of the dilute organic wastes in aqueous solution that result from the many chemical manufacturing processes at the Bristol plant of Rohm and Haas are discussed. Six pages, three tables, one reference. ("Journal of Sewage and Industrial Wastes," July 1956, page 866.)

Industrial toxics

Assimilation behavior of toxic organic compounds in natural water is discussed; history, techniques, and procedures are included. Ten pages, eleven figures, ten references. ("Sewage and Industrial Wastes," September 1956, page 1137.)

Coal preparation

Opportunities in coal preparation are discussed and eleven suggestions for improving efficiencies of coal cleaning plants are given. Goals for research in methods of preparation are included. Five pages, four figures. ("Mechanization," September 1956, p. 69.)

Liquid-metal solutions

Surface tensions of binary liquid-alloy mixtures can be calculated by means of two analytical methods. Nine pages, three tables, 11 figures, 19 references. ("Acta Metallurgica," September 1956, page 460.)

Corrosion

Suggestions for solving corrosion problems by means of chemical treatment and control are made. Tests, interpretations included. Four pages, one figure. ("Water Works Engineering," August 1956, page 732.)



**Just push one knob
TO UNLOAD THIS CENTRIFUGAL**

That's all you do, and the plow swings out to the side of the basket . . . plows down the basket side . . . travels back and then swings out of the way. Solids meanwhile discharge quickly through the bottom. For this is the new Tolhurst Batch-Master® Centrifugal - which combines quick discharge with the greater stability of Center-Slung® Suspension. It needs no more headroom than a man, requires no center spindle from above.

Batch-Master offers a choice of perforate and imperforate baskets . . . corrosion-resistant materials . . . manual unloader if desired. "All-speed" drive lets you select the best speed for loading, spinning, unloading. Send for 4-page bulletin.

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A DIVISION OF
American Machine and Metals, Inc.
Specialists in liquid-solids separation
Dept. CPT-1256, EAST MOLINE, ILLINOIS

Send your new free 4-page Bulletin TC-14-56 giving full data on Batch-Master Centrifugal.

NAME AND TITLE _____
COMPANY _____
ADDRESS _____
CITY _____ ZONE _____ STATE _____

When inquiring check 9548 opposite last page



Study in symmetry is provided by redwood cooling tower, which adds much to the attractiveness of plant

While resistance to the ravages of the Texas sun, high humidity, and salt air with a minimum of maintenance is an important advantage—

FLEXIBILITY IS FEATURE OF COOLING TOWER

As plant capacity expanded, additions were twice made to present ten-cell unit, which will continue to operate in the event of either a steam or a power failure

GORDON WEYERMULLER, Associate Editor
With M. H. HOLMES, Plant Manager
Jefferson Chemical Company, Inc.
Port Neches, Texas

Problem: High humidity of the air at Port Neches, Texas made it difficult to cool processing water at the Jefferson Chemical plant located there. Extreme weather conditions and the salt air had to be faced by a cooling tower. A unit was needed that could be expanded easily as plant capacity increased. Nature of operation made it necessary that the cooling tower continue to oper-

ate in the event of a power failure. Plant produces ethylene glycol, diethylene glycol, triethylene glycol, ethylene oxide and other chemicals.

Solution: In 1948 plant placed a six-cell redwood cooling tower in operation which utilizes the principle of horizontal, cross-flow of air to obtain maximum cooling efficiency. Each cell is equipped with a 212" diameter induced-draft fan powered by a 60-hp motor. After initial installation, two additional cells were added in 1950 to original six and two more in 1952 to make the present ten-cell cooling tower. This increased the capacity of the unit to the present average of 29,000 gpm of water.

In present system, six pumps are available for circulation of cooling water. Two of these are powered by synchronous motors and three by steam turbines. Other pump can be driven by either an electric motor or a steam turbine; it may be coupled to either shaft.

Tower is designed to cool water from 120° to 85°F, with a maximum wet bulb temperature of 79°F. Due to evaporation and other losses, about 600 gpm of makeup water is required for cooling system. This water is obtained from water plant where it is prechlorinated and coagulated. It is further treated when it reaches cooling system.

Inhibitors are added to prevent corrosion and scale formation. Chlorine is introduced to reduce algae growth and caustic added to control pH. As a check on effectiveness of treatment, sample strips are regularly placed in water lines and sent to laboratory for analysis.

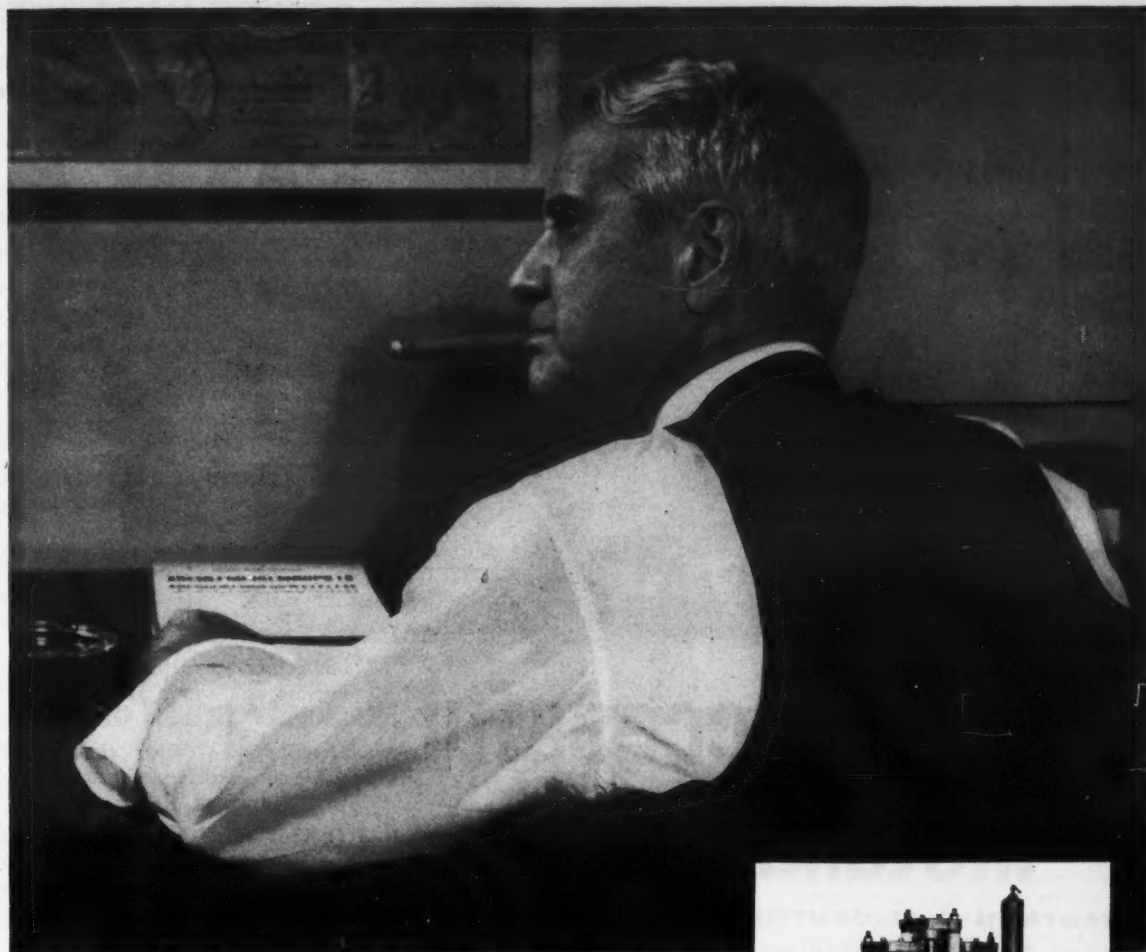
Results: Flexibility is probably the outstanding feature of the present cooling system. Although additions have twice been made to the tower, it is still a unified structure which adds much to the attractiveness of the plant. Arrangement of pumps reduces the possible hazard in event of a power failure. Although maximum pumping capacity is 35,000 gpm, about 20,000 gpm of water will continue to circulate in case of either a steam or electric power failure.

Cooling tower has given good service. In spite of the high humidity, efficient cooling has been obtained. Tower is in excellent condition, having stood up well under the adverse atmospheric conditions of the Texas area. Redwood construction requires no painting. No maintenance to speak of has been needed on tower.

(Cooling tower is product of The Marley Company, Dept. CP, 222 W. Gregory Blvd., Kansas City 14, Mo. . . or for more information check 9549 on form opposite last page.)



"Run for your life, Ed... the tank's busting!!"

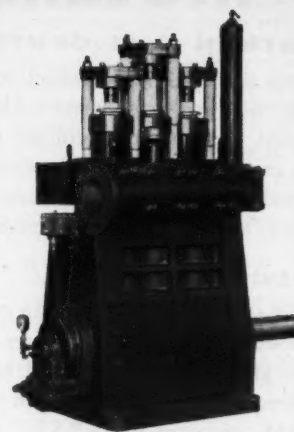


"And I say it has to be an ALDRICH PUMP!"

Corrosion, abrasion, high viscosity, high pressures . . . overcoming these problems has given Aldrich the reputation for building pumps that do the "impossible". The tougher the job . . . the more important it becomes to take advantage of our wide experience in building pumps for the chemical industry.

On the less critical jobs, too . . . it makes sense to call Aldrich. The simplicity of the Aldrich Direct Flow design, with fluid-end sectionalization, offers substantial economies in both operation and maintenance. Fluid-end designs are available in aluminum bronze, stainless steel, Hastelloy and titanium.

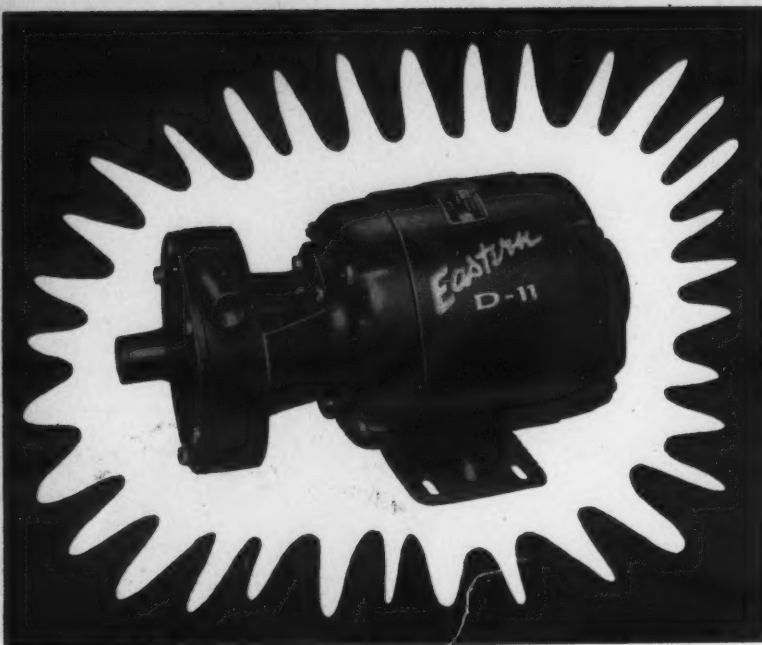
A copy of our new condensed catalog showing the line of Aldrich Pumps, is yours for the asking. Write today for Data Sheet 100. The Aldrich Pump Company, 23 Gordon Street, Allentown, Pa.



Aldrich Direct Flow Pumps are especially well suited to chemical service. The complete Aldrich line includes Triplex, Quintuplex, Septuplex and Nonuplex Pumps, 25 to 2400 hp.

THE
ALDRICH
PUMP COMPANY

When inquiring check 9550 opposite last page



24,830 successful installations!

EASTERN D-11 CENTRIFUGAL PUMP

Why is the D-11 so successful among original equipment manufacturers? *Size and weight* make it ideal. The D-11 is the smallest, close-coupled, single-stage centrifugal pump available with an induction type motor. Eighteen pounds of compact design (9 $\frac{3}{4}$ " x 4 $\frac{5}{8}$ "") make it excel in industrial and process equipment, as well as laboratory service, and pilot plant operations.

SPECIAL METALS

A full selection of metals make the D-11 and other Eastern Centrifugal Pumps versatile performers. Available in 18-8 Type 303 and Type 316 Stainless Steel, Monel, Hastelloy "C", Cast Iron and Bronze, Eastern Pumps range from $\frac{1}{8}$ th to $\frac{3}{4}$ H.P. with capacities up to 70 G.P.M., pressures to 65 P.S.I.

For complete specifications on all Eastern Centrifugal Pumps, request Bulletin 120-F



Eastern



INDUSTRIES, INC.
100 Skiff St., Hamden 14, Conn.

When inquiring check 9551 opposite last page

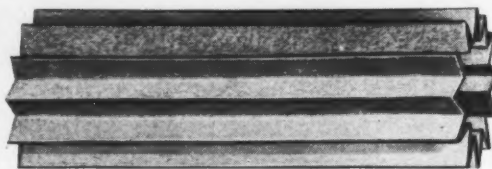
ENGINEERING & MAINTENANCE

Powdered bronze filter elements with maximum area, made to blueprint specifications . . .

elements available for particle size removal from 2 microns up to 151 microns

Uses: Filtering harmful solids and contaminants from fluids used in hydraulic and pneumatic systems.

Features: Powdered bronze filter elements are made to blueprint specifications. Processing meth-



Powdered bronze filter element provides largest possible surface filtering area

ods permit production of elements with maximum filtering area within allowable over-all dimensional tolerances.

Description: Filter elements are available in grades of particle size removal from 2 microns up to 151 microns.

(Porous metal filter elements are product of Arrow Sintered Products Co., Dept. CP, 1904 S. Kostner Ave., Chicago 23, Ill. . . or for more information check 9552 on form opposite last page.)

Adhesive remains flexible, has good color retention, moisture resistance . . .

material can be applied easily by brushing or spreading with a notched trowel

Uses: For joining any combination of plywood, plastic, fiberglass, foam rubber, natural fiber textiles, metal, plaster, concrete, and ceramics.

Features: Contact adhesive remains flexible permanently. Bonded assemblies may be bent without damage to the glue line. Light-colored material has good color retention, water and moisture resistance. It can be applied easily by brushing or spreading with a notched trowel or, when diluted with toluene, it can be sprayed.

Description: Adhesive is formulated for an open time of 15 minutes to an hour. Its coverage will be 100 to 200 sq ft/gal. Solids content is 25%. It comes available in quart, gallon, 5 gallon, and 50 gallon drum containers.

(Plitac Contact Adhesive is a product of The Goodyear Tire & Rubber Co., Dept. CP, Akron 16, Ohio. Check 9553 on form opposite last page.)

VERSATILITY COUNTS IN OUR BUSINESS

The ability to study a customer's specifications; correctly fabricate, ship and erect his order on time is our stock in trade.

Versatility and alertness are watchwords with us because we never know what the next order will bring. Each job is designed to satisfy the customer's own particular requirements. So, if you're thinking of:

- Pressure Vessels
- Stacks
- Special Weldments
- Other Steel Plate Products
- Storage Vessels
- Piping
- Field Construction

Better Call

Us Today!



**The
YOUNGSTOWN
STEEL TANK
COMPANY**
Youngstown,
Ohio

When inquiring check 9554 opposite last page

CHEMICAL PROCESSING

Will handle stepwise compression of process loads and knockouts with one compressor casing . . .

liquid interstage injection cooling reduces heat of compression

Uses: Compressing air, ammonia, and most hydrocarbon gases.

Features: Compressor has accommodations for large bleed-in bleed-out flows to permit handling of different levels of refrigeration or stepwise compression of process loads and knockouts with one compressor casing. Liquid interstage injection cooling reduces heat of compression.

Description: Compressor is available in five casing sizes in capacities ranging from 570 to 82,000 cfm with discharge pressure to 950 psig. Bearings are externally mounted and open to atmospheric pressure. Horizontally split, enclosed diffusers allow continuous gas guidance through compression range.

(Multi-Stage Compressor is a product of Worthington Corporation, Dept. CP, Harrison, N. J. . . . or for more information reader may simply check 9555 on the Reader Service slip which is located opposite last page.)

Operation of fluid drive described in bulletin

Oil flow diagrams, oil and electrical circuits, typical machine cycles, electric control components, and pump and base installation drawings for company's fluid drive are contained in 12-page bulletin. Two sizes of pressure-compensated, variable-displacement, radial rolling piston pumps and two constant-displacement traverse pumps are described.

Bul 44200-A is issued by The Oilgear Co., Dept. CP, 1568B W. Pierce St., Milwaukee 4, Wisconsin. When inquiring reader may simply specify 9556 on the Reader Service slip which is located opposite last page.

Fan facts

Catalog of 36 pages presents a variety of facts on centrifugal fans and accessories. Construction specs, capacity tables, and tables and charts for judging fan performance are included.

Cat 55 is available from Garden City Fan Co., Dept. CP, 332 S. Michigan Ave., Chicago 4, Illinois. When inquiring reader may simply specify 9557 on the Reader Service slip which is located opposite last page.

BRIDGEPORT BRASS COMPANY CONDENSER AND HEAT EXCHANGER TUBE EDITION

COPPER ALLOY BULLETIN



MILLS IN BRIDGEPORT, CONN. AND INDIANAPOLIS, IND.—IN CANADA: NORANDA COPPER AND BRASS LIMITED, MONTREAL



Replacing a copper alloy tube bundle after cleaning.

How to Reduce Exchanger Maintenance Costs by Using Performance Records

Although tube and shell heat exchangers fall into well-defined classes of design and operation, the variables in each exchanger situation make it an "individual" in respect to performance or corrosion failure. For this reason, comprehensive and continuing performance records on each exchanger are essential in achieving maximum operating efficiency and productivity.

Why Keep Records?

The primary purpose is to establish a performance pattern which will suggest a minimum though adequate maintenance schedule. Proper records should also help to detect variations in operating conditions which, though slight, may require significant changes in maintenance scheduling.

Tube Selection Important

Such performance records can also help determine whether or not the best exchanger design or tube alloy is being used. For example, although Bridgeport Arsenical Admiralty or Arsenical Muntz would ordinarily be indicated for saline or brackish cooling water, adequate records will often reveal that Bridgeport Duplex, Copper, Red Brass, Arsenical Aluminum Brass, Duroz IV or occasionally 70-30 Cupro Nickel would be more economical.

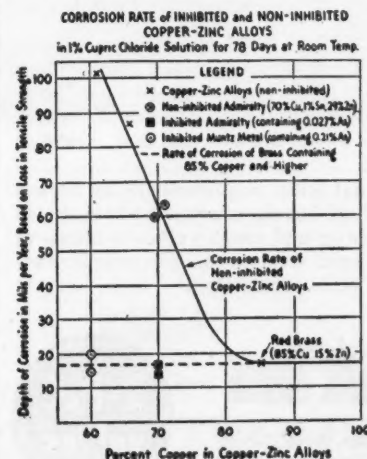
Preplanning and Scheduling

Another benefit in adequate record-keeping is in the preplanning of maintenance repairs. The nature and extent of the maintenance can be known and prepared for previous to shutdown, per-

mitting servicing with minimum loss to operating time. Likewise, sufficient lead time can be allowed in ordering tube replacements or in obtaining qualified technical help in determining the proper tube alloy to use if this is indicated.

Watch Those "Variables"

A file of records does not in itself constitute a maintenance program. Instead, critical evaluation must be made of each report so that existing maintenance schedules may be confirmed or altered. A particularly keen eye should be kept on those variables not normally recorded by the operating staff. Minor changes in water composition or product streams



may not be important in production, but may significantly affect fouling or corrosion rates. For instance, in petroleum refining and petrochemical processing, the hydrocarbons have virtually no effect on copper and its alloys. But the presence of sulfides, chlorides, acids, ammonia, gases and moisture influenced by variations in temperatures, velocity and pressure will have an important effect on corrosion. Thus, where conditions such as these are detected, and where operational adjustments are not feasible, consideration should be given to the use of the other copper-base alloys or Duplex tubing.

Records Help Lick Dual Corrosion

Another advantage of adequate record-keeping is in high-lighting the need for maintenance-reducing techniques. For example, under some conditions, the use of higher grade components, such as Duplex tubes, proves economical when yearly costs are totaled up. The experience of one refinery demonstrates this point. In an exchange between ammonia and hydrogen sulfide bearing propane gas and river water, the continual failure of steel and red brass tubes made it necessary to retube the exchangers every one or two years. A change-over to Bridgeport Duplex Tubes—with low carbon steel on the product side and red brass on the water side—resulted in an average life of from 6 to 10 years.

Technical Service

These are just a few of the advantages of keeping maintenance records on performance and how they can provide a clue toward solving your corrosion problems. For more specific help, the advice and experience of Bridgeport's Technical Service and Corrosion Laboratories are at your service through your nearest Bridgeport Sales Office. This service, plus Bridgeport's extensive selection of tubes and alloys, will enable you to meet your needs faster, easier and more economically. (842)

Further Help From Bridgeport's Condenser Tube Handbook

A wealth of practical detailed information on tube condensers and heat exchangers is contained in the Bridgeport *Condenser Tube Handbook*. Anyone concerned with the specifications, operation or maintenance of such units will find it an invaluable addition to his reference library. Write for your free copy.

When inquiring check 9558 opposite last page

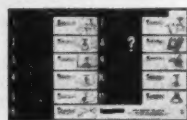


Bronze Globe Valves

14 DIFFERENT MODELS— ONE FOR YOUR SPECIFIC REQUIREMENTS

• R-P&C's complete valve line includes 14 different models of bronze globe valves, each in a complete range of sizes. Ranging in pressure classes from 125 to 300 lbs., they include flanged or screwed ends, union or screwed bonnets and a variety of seat and disc constructions. One of these 14 valves will solve your particular problem.

For example, Fig. 427-DP above was developed specifically for services where control or regulation of flow is required. The full-plug construction permits closer regulation—and the stainless steel seat and disc (500 Brinell) resist wire-drawing, give longer life. Rated for 300 lbs. Steam—1000 lbs. owg.



FREE WALL CHART
"How to Protect Your Valves"
22" x 17" wall chart
gives installation and
operation pointers.
Tells how to protect
valves, prolong life.
Write for your copy.

The Fig. 1-A valve, rated for 150 lbs., was developed for applications requiring tight shut-off and frequent operation. The special asbestos-composition disc seats tightly even if particles of foreign matter are trapped between seat and disc. The disc is easily renewed.

No matter what your requirements in bronze globe valves, R-P&C has the answer. And this holds true for angles, gates and check valves in iron and cast steel, also forged steel gates. See your R-P&C dealer today, or write for catalog.

ACCO



**R-P&C Valve Division
AMERICAN CHAIN & CABLE**

Reading, Pa., Atlanta, Boston, Chicago, Denver, Detroit,
Houston, New York, Philadelphia, Pittsburgh, San Francisco,
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**R-P&C
valves**

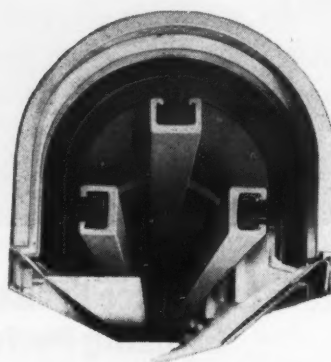
When inquiring check 9559 opposite last page

ENGINEERING

**Supplies power at 300 amp,
at voltages to 575 AC,
for moving units**

Uses: Supplying electric current to cranes, hoists, welding equipment, or other moving units.

Features: Enclosed trolley busway system provides a safe, efficient way to supply power of up to 300 amp at voltages up to 575 AC or 250 DC.



Supplies electric current for
cranes and other moving units

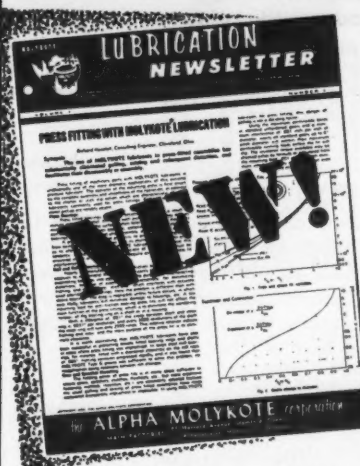
Description: System's three insulated aluminum bus bars are arranged in a delta pattern and completely enclosed in an aluminized steel housing. Bottom safety covers prevent accidental contact from below with current carrying members. Trolley is available in 100, 200, and 300 amp capacity. Track sections are 30' long.

(Lec-Trol-Feed enclosed trolley busway system is manufactured by Electric Service Manufacturing Co., Dept. CP, 17th and Cambria St., Philadelphia 32, Pa. . . or check 9560 opp. last page.)

**Metals for service
above 1600°F**

Papers on metals, suitable for use at temperatures of 1600°F and higher, are presented in 200-page publication. Tech pub is available from American Society for Testing Materials, 1916 Race Street, Philadelphia 3, Pennsylvania.

A TECHNICAL NEWSLETTER ON LUBRICATION WITH MOLYKOTE . . .



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HAVEN'T
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SEND
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IT
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AWAY!**



Every issue features a technical article on the use of MOLYKOTE Lubricants in industry • "How-to" stories on tough lubrication applications • Filled with engineering data which applies to all industries • Being published regularly.

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Main Factories: 65 Harvard Avenue, Stamford, Conn.
71 Arnulfstrasse, Munich 19, Germany

When inquiring check 9561 opposite last page



**"What's A
New Solution?"**

It's an article in CHEMICAL PROCESSING describing a new way of solving a tough plant operating problem. In each issue you will find specific "case histories" showing how these processing problems were solved. Each article states the operating problem . . . explains the process used and gives details of how problem was solved . . . shows results secured.

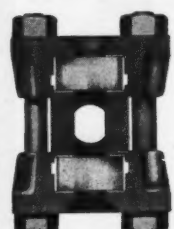
Take a look at "New Solutions" articles in this issue — they might suggest a "solution" for some of your tough processing problems.

CHEMICAL PROCESSING

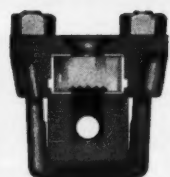
Strahman

HIGH PRESSURE GAUGES

USED IN
REFINERIES
AND
CHEMICAL PLANTS
THROUGHOUT
THE WORLD



THRU VISION



REFLEX
Single or Multiple
Sections

TUBULAR

Gauge Cocks
Large Chamber
Reflex Gauges
Heated or Cooled
Gauges

SEND FOR
COMPLETE
CATALOGUE

STRAHMAN VALVES, Inc.
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When inquiring check 9562
opposite last page

DECEMBER 1956

ENGINEERING & MAINTENANCE

**Priming problems eliminated,
regardless of liquid temp,
with submerged pump**

Uses: Pumping liquids in refineries, bulk plants, barge unloading stations, or any installation where suction problems exist.

Features: Submerged, rotary, positive - displacement pumps eliminate priming problems regardless of temperature of liquid. Pumps operate on a patented principle of rotary positive displacement design.

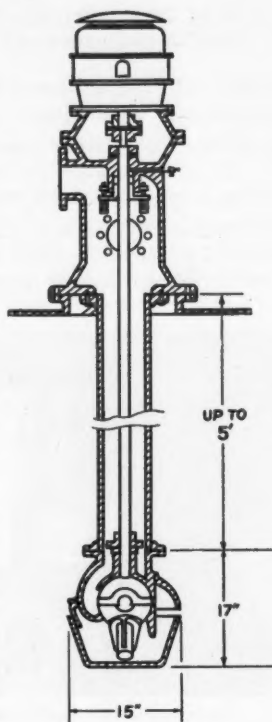
Description: Submerged pump is available in capacities up to 300 gpm, complete, ready to install. Discharge column and driving head are integral with pump. Suction assembly can be lowered into a man-hole of 15" ID and can be used in either shallow or deep tanks. Additional sections are available. Pump is driven through a vertical steel shaft within discharge column and powered by an explosion-proof electric motor. It can be operated by gasoline engine or belt drive if desired.

(Granco submerged rotary positive-displacement pump is a product of Granberg Corporation, Dept. CP, 1308 67th St., Oakland 8, Calif. . . . or for more information reader may simply check 9563 on form opposite last page.)

**Wide size range available
of spectacle blinds**

Spectacle blinds are now available in an outstanding range of sizes fabricated from various carbon and alloy steels. Blinds are dimensioned from one inch pipe size weighing 12 oz to 24-inch, flange units weighing 2000 lb.

(Spectacle blinds are produced by The Mack Iron Works Co., Dept. CP, Sandusky, Ohio . . . or for more information reader may simply check 9564 on the convenient Reader Service slip which is located opposite last page.)



WHAT'S THE PRICE OF THIS AGITATOR?

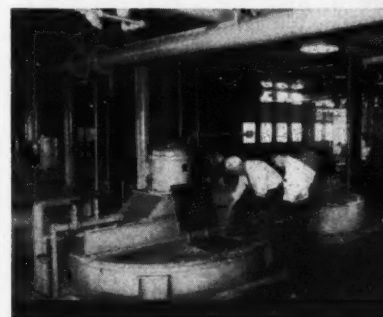
There are three "price tags" that add extra value to the purchase price of a Nettco Agitator. These are:

The engineering "price tag" — your assurance the Nettco drive is the right size, the right speed, the right horsepower, the right shaft diameter — backed by Nettco's over 50 years of serving the agitation needs of industry.

The operating "price tag" — your assurance the Nettco unit is engineered for low power consumption and high productivity — two vital economy factors in any processing system.

The maintenance "price tag" — your assurance the Nettco drive will minimize maintenance: with a minimum of moving parts — all conservatively rated.

Next time use Nettco — for engineered agitation that's lowest cost in the long run. Send for data and recommendations, to New England Tank & Tower Company, 93 Fieleton Street, Everett 49, Massachusetts.



Installation of Nettco Agitators in new multi-million dollar dyestuffs plant — complete plant served by Nettco Engineered Agitation.

HELPFUL NETTCO CATALOGS
General Bulletin No. 531
Side Drive Agitators, Bulletin No. 532
Nettco Flomix ®, Bulletin No. 531



When inquiring check 9565 opposite last page

**Tomorrow's
MODERN DESIGN
for
Today's Demands!**

MORRIS PUMPS

**keep the aluminum industry rolling toward
GREATER CAPACITY**

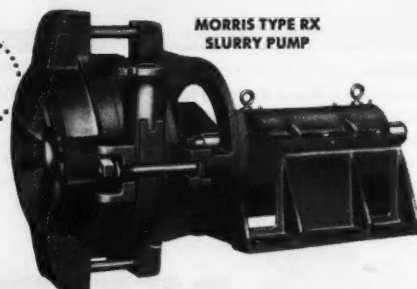
In pace with the far-sighted aluminum industry, other leading manufacturers the country over shrewdly specify Morris for heavy duty pumping.

The Morris Type RX Slurry Pump is rugged, dependable, and trouble free. It's specifically designed for heavy pumping; gives peak performance under all conditions, including heavy, coarse or fine slurries, dispersions and sludges.

The Morris pump operates with minimum attention . . . lowers maintenance costs . . . can be quickly dismantled for inspection . . . avoids lengthy lay-up time. For heavy duty pumping . . . specify Morris.

WRITE TO MORRIS TODAY for recommendations of the pump best suited to your size, capacity, specifications. Ask for Bulletin 185.

MORRIS
CENTRIFUGAL
PUMPS



MORRIS TYPE RX
SLURRY PUMP

MORRIS MACHINE WORKS

Baldwinsville, N. Y.

Sales Offices in Principal Cities

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ENGINEERING & MAINTENANCE

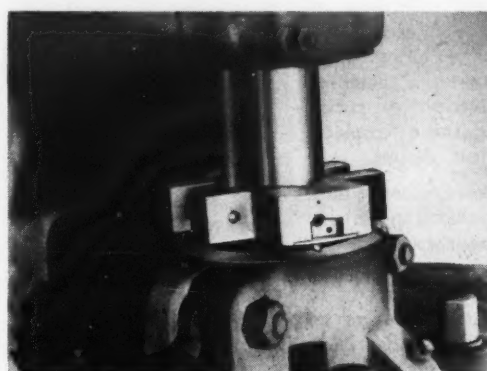
**Stuffingbox precision machined
to take a mechanical seal,
with refacing tool . . .**

hand device prepares a smooth gasket surface on stuffingbox end

Uses: To prepare pump stuffingboxes for mechanical seal installation.

Features: Precision hand tool prepares a smooth gasket surface on the stuffingbox end to assure proper mechanical seal performance.

Description: Tool is available in three standard sizes to accommodate shaft from $\frac{3}{4}$ to 3". It is chrome plated and is shipped complete with



Refacing tool aids mechanical seal performance

wrenches and two extra tool bits. Assembly consists of a tool bit and holder which mounts on pump shaft. Bit is adjusted to bore of stuffingbox and worked outward by turning shaft with a Stillson or strap wrench. Result is a smooth end machine at right angles to shaft axis.

(Stuffingbox Refacing Tool is a product of Byron Jackson Pumps, Inc., Dept. CP, PO Box 2017A, Terminal Annex, Los Angeles 54, Calif. . . or for more information check 9567 on form located opposite last page.)

Tables facilitate selection of variable pulley

Catalog of 18 pages presents ratings, dimensions, and engineering information on variable pulleys and combination pulleys. Tables and formulas in engineering section are arranged to facilitate selections. Photos and drawings show how pulleys are used and advantages to be gained.

Cat 60A is issued by Lewellen Manufacturing Co., Dept. CP, Columbus, Ind. When inquiring reader may simply specify 9568 on the convenient Reader Service slip which is located opposite last page.

**Stop
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**in piping
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- Water
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CHECK VALVES**

Providing dependable protection against damage from "surge pressures," these *Silent* Check Valves may be installed in horizontal, vertical and angular positions.



Write for Bulletins:
No. 654 on the Valves
No. 851 on Cause, Effect
and Control of Water
Hammer

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Our 70th Anniversary • 1886-1956

When inquiring check 9569
opposite last page

CHEMICAL PROCESSING

NEW LIGHTWEIGHT HYDRAULIC BENDER BY GREENLEE



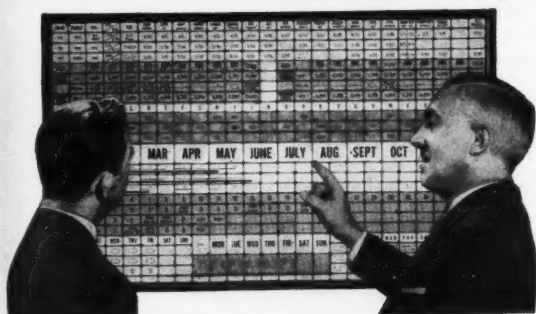
full 90° bend with one stroke
of the ram . . . easy portability
. . . extra versatility

Here's the kind of real portability you've been looking for in a bender for 1/2" to 2" pipe and conduit. Using light, but strong, aluminum alloy for many parts the new GREENLEE No. 880 Hydraulic Bender is unusually *lightweight*, yet extra rugged, fast, *powerful*! One man can easily carry and operate it to quickly make *uniform* bends. Complete 90° bends can be made with one ram stroke! Separate two-speed hydraulic hand pump and ram simplify handling and setup. Easily operated by hand or can be used with a power pump. Attachments also available for bending thin-wall conduit, tubing, bus-bars. Get complete details, write for Bulletin E-217.



GREENLEE TOOL CO., 2392 HERBERT AVE., ROCKFORD, ILL.
When inquiring check 9570 opposite last page

How To Get Things Done



BOARDMASTER VISUAL CONTROL

Gives you a Graphic Picture of your operations, spotlighted in color. You See what is happening at a glance. Facts at eye level — saves you time, prevents errors.

Simple, flexible — easily adapted to your needs. Easy to operate. Type or write on interchangeable cards, snap in grooves. Ideal for production, scheduling, sales, traffic, inventory, etc. Made of metal. Compact, attractive.

Complete Price \$49⁵⁰ Including Cards

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GRAPHIC SYSTEMS

55 WEST 42nd STREET
NEW YORK 36, N. Y.

When inquiring check 9571 opposite last page

DECEMBER 1956

Though small in size
control valve has
wide use range . . .

bodies and trim are fabricated from variety of metals

Uses: Flow of fluid control. Valve can be used for on-off or 3-15 psi control; air to open, or air to close.

Features: Control valve is small, overall height approximately 12". Because of wide variety of metals and alloys available for bodies and trim, and precision of plugs and seats, units are capable of withstanding a wide range of working pressures and temperatures.

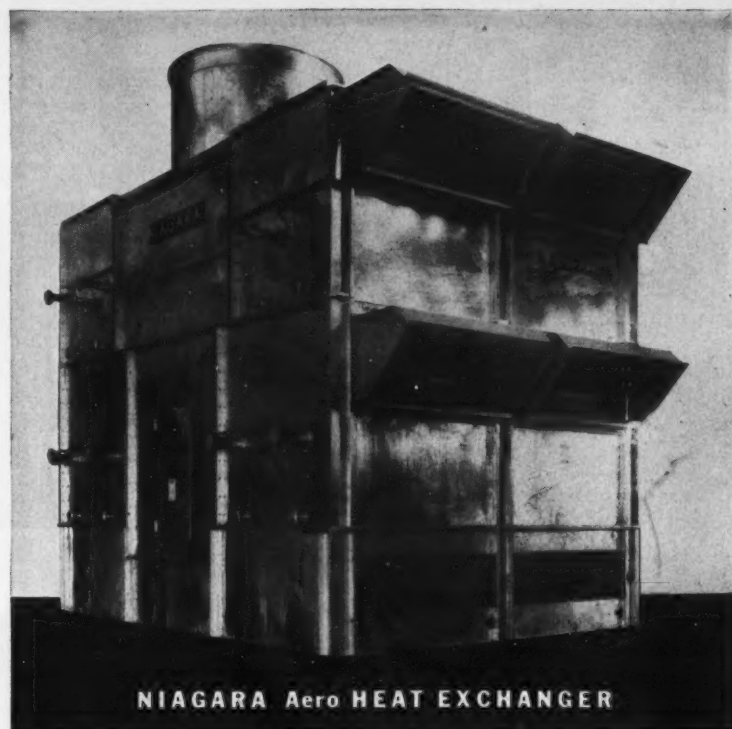


Control valve has overall height of approximately 12"

Description: Top works is semi-steel with diaphragm operators, adjustable spring, screwed bonnet, and Teflon packing. Valve bodies can be supplied in Type 303 or Type 316 stainless, brass, steel, aluminum, Monel, or other special alloys.

Flow coefficient: Cv. 0.0001 to Cv. 2.5 with spline plug and removable seat. Sizes: 1/4 to 1".

(Series 800 control valves are product of Uniflow Valve Corporation, Dept. CP, 19 Quine Street, Cranford, New Jersey. . . or for more information reader may simply check 9572 on the Reader Service slip which is located opposite last page.)



NIAGARA Aero HEAT EXCHANGER

WATER SAVING *with* Trouble-Free Cooling Equipment

• Cools your jacket water for engines or process equipment or electric apparatus. Your closed system keeps free from dirt or maintenance troubles. You can cool air, gases, chemicals, plating baths, quench baths, welding machines, extrusion and drawing machines and hydraulic presses. You get real precise temperatures, save rejections, lower production costs. Use NIAGARA AERO HEAT EXCHANGER cooling with atmospheric air...saves water, pumping, piping and power; quickly saves its costs.

Convenient Units Up To 30,000,000 BTU Capacity

Write for Bulletins No. 120, 124 and 132



NIAGARA BLOWER COMPANY

Dept. CP, 405 Lexington Ave., New York 17, N. Y.

Niagara District Engineers in Principal Cities of U. S. and Canada

When inquiring check 9573 opposite last page



The proven partner for PVC Piping

For the finest valving in plastic piping systems—specify the valve with experience “built-in”—The Hills-McCanna Diaphragm Valve made of PVC.

ONLY Hills-McCanna Plastic Valves offer all these features—

- Complete chemical resistance of unmodified PVC.
- Rugged body construction with heavy wall sections and embedded reinforcing members.
- Positive valve closure with exclusive sealing bead diaphragm.
- Simple, cost-saving in-line maintenance.
- 25 years of diaphragm valve manufacturing and application experience.
- More than 10 years of research and manufacturing experience on plastic valves alone.

PVC is just one of several plastic body materials offered by Hills-McCanna. Also available are bodies of polyethylene, Saran and Uscolite. Diaphragm materials include rubber, neoprene, Hycar, Tygon, Compar, polyethylene, Kel-F and Teflon. Size range from $\frac{1}{2}$ " through 2". Sold and serviced by Hills-McCanna representatives coast to coast and by leading distributors of plastic pipe. For further information request Catalog No. 100.

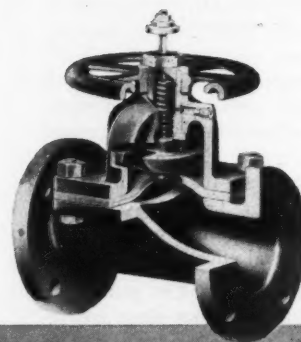
HILLS-McCANN A CO.

2370 W. Nelson St., Chicago 18, Ill.

MANUFACTURERS OF: DIAPHRAGM VALVES • CHEMICAL METERING AND PROPORTIONING PUMPS • FORCE FEED LUBRICATORS • LIGHT ALLOY CASTINGS

When inquiring check 9574 opposite last page

PVC
Diaphragm Valves
by Hills-McCanna



HILLS-McCANN A

Corrosion Specialists Since 1870



Liquid Carbonic's plant produces 60 tons/day of dry ice or liquid carbon dioxide. CO₂ is obtained from flue gas of boilers (arrow)

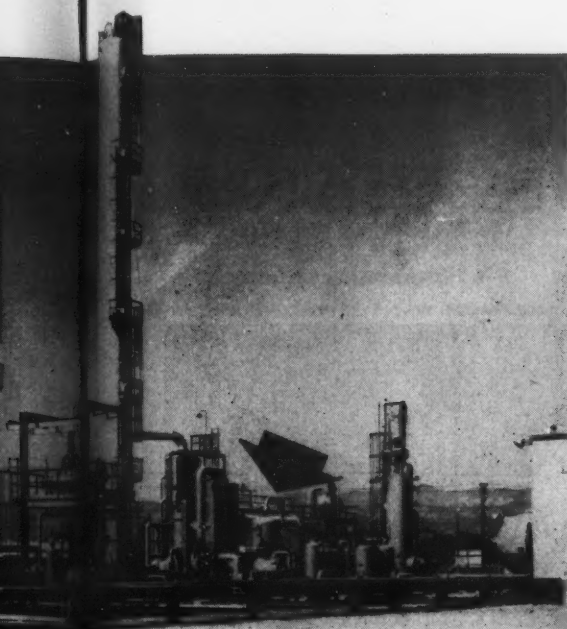
Stringent control of excess air maintains efficient burning of oil or gas at Liquid Carbonic Corp., where boiler provides . . .

high - CO₂ flue gas for dry ice plant

THEODORE W. WETT, Assistant Editor
With NORMAN CALLNER, Chief Engineer
Liquid Carbonic Corp., Chicago, Illinois

Liquid Carbonic Corporation is more interested in the stack gases from their boiler than in steam production. At company's 60 ton/day plant in Oakland, California, all CO₂ for dry ice and liquid carbon dioxide manufacture is supplied by boiler flue gas. Stringent control of excess air requirements assures most efficient production of CO₂ from every pound of oil or gas burned. When unit is gas fired, CO₂ content of exit gas is approx. 11%, and when oil fired, content is 15%. Boiler is designed for both oil and gas firing, operates under fully automatic control, with a furnace temperature of 2300 to 2700°F.

Excess air requirements generally considered standard in industry are 10% in furnace and 15%



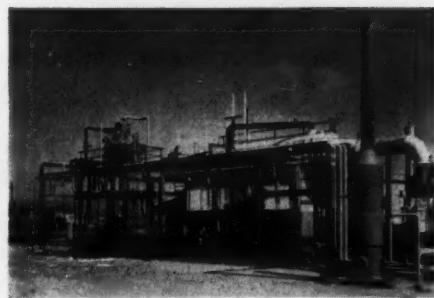
in boiler exit when gas fired and 15% in furnace and 20% in exit when oil fired. Lower values maintained at Liquid Carbonic keep CO₂ content at desired high level.

Tabulation of operating characteristics

| | Oil | Gas |
|--------------------------|--------|--------|
| Pounds of steam/hr | 29,000 | 39,000 |
| Feedwater temp °F | 274 | 274 |
| Operating pressure psi | 430 | 430 |
| Steam outlet temp °F | | |
| (total steam temp) | 620 | 620 |
| Excess air in furnace % | 5 | 5 |
| Excess air boiler exit % | 8.5 | 8.5 |

Final design of boiler was based on quantity of carbon dioxide needed for plant operations. Plant is designed to produce 60 tons of carbon dioxide per 24 hr day. Steam produced is used for power.

(Boilers producing CO₂ were supplied by Erie City Iron Works, Dept. CP, Erie, Pa. . . . or for more information check 9575 opposite last page.)



Boilers operate with 5% excess air in furnace, 8½% excess air at boiler exit

See how straight reciprocal drive eliminates major replacement part problems.

SEE HOW A *new heart* PUTS *new life* IN YOUR WATER TREATMENT SYSTEM!

See how Hills-McCanna metering pumps can meet your exact requirements.

See how Hills-McCanna design gives you greater dependability, accuracy and longer pump life.

HILLS-McCANNNA
*pumps out
"new life"*

SEND FOR THIS NEW FACT-FILLED BOOKLET NOW!

Here's useful information to help you get more from your present water treatment system . . . to help you in the selection of the proper metering pump for your particular application. This big 12-page booklet is complete with technical information, installation drawings, tables of capacities and pressures, and pump construction recommendations for metering all types of liquids. It's like having a consulting engineer at your fingertips! Write for your copy now!

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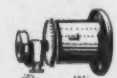
When inquiring check 9576 opposite last page

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SLY
FLAT BAG
DUST FILTERS
get all
the dust

COMPLETE RANGE

Dynaclone and Continuous-Automatic
for continuous operation

Standard Dust Filters for
intermittent operation

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Designers and Manufacturers of: Dust
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OFFICES IN
PRINCIPAL CITIES

PIONEERS AND LEADERS IN INDUSTRIAL DUST CONTROL

When inquiring check 9577 opposite last page

engineering and
maintenance

Dust control system at Pure Oil's Toledo refinery
recovers 700-800 lb CuO every 24 hr

SAVES \$350-400 PER



Exterior view of Pure's regeneration plant. Dust from roaster and handling equipment is drawn
into the base of the filter. Centrifugal fan draws air through filter and exhausts dust free air

CHEMICAL PROCESSING

00 PER DAY

Orlon bags withstand 210° F
in closed system of rejuvenation step
of naphtha desulfurization process

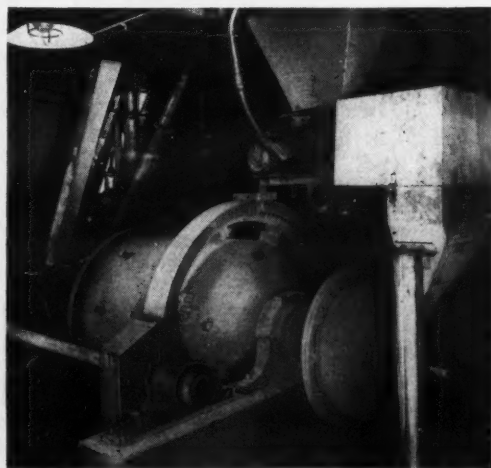
BILL SCHREMP
Assistant Editor

Problem: Rejuvenation plant at the Toledo refinery of Pure Oil Company was losing considerable amounts of powdered copper oxide into the air as dust. Besides expense involved, this also caused undesirable working conditions.

The CuO, in slurry form, is used as a treating agent in desulfurization of naphtha. Hydrocarbon vapors bubbling through the slurry are stripped of sulfur, converting the CuO to CuS. Before the material can be reused the sulfide must be regenerated back to the oxide.

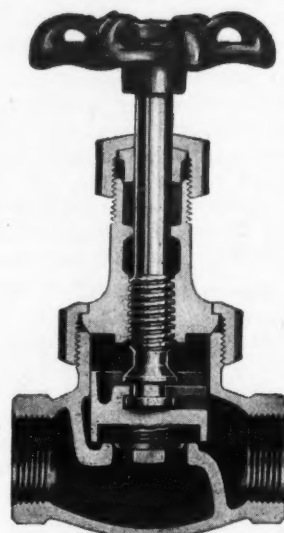
Spent sulfide sludge is first dried in rotary kilns and then moved into a flat-hearth roaster to burn out the sulfur. A ball mill pulverizes the resulting CuO so that it will pass a 325-mesh screen. Screw conveyors, vibrating conveyors, and elevators move the material throughout the process.

(Please turn to next page)

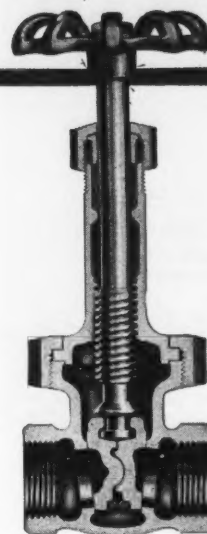


Dust from ball mill is picked up by hood at right. System has resulted in CuO savings of 800 lb daily

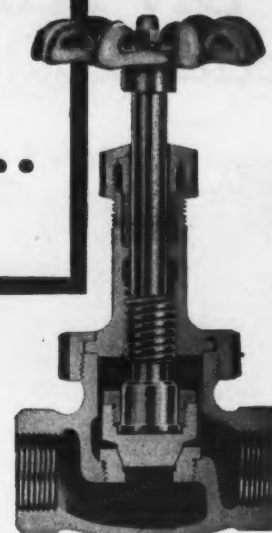
Walworth bronze valves...



Walworth No. 95 Globe Valve
Re-New-Disc



Walworth
No. 29 Gate Valve



Walworth No. 225P Globe Valve
500 Brinell Seat and Disc

**built to give
dependable trouble-free service
on all recommended jobs**

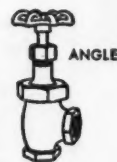
Walworth No. 95 Bronze Globe Valves (Angle Type: No. 96) are recommended for service where throttling is not required. They are rated at 150 psi working steam pressure, 500F; 300 psi cold water, oil or gas. The improved renewable disc and lock-on, slip-off disc holder — an original Walworth development—saves time and trouble. This valve can be repacked under pressure when fully opened. All parts are designed to give maximum service and strength.

Walworth No. 29 Bronze Gate Valves are rated at 200 psi working steam pressure, 550F; 400 psi cold water, oil and gas. These valves have rising stems and integral seats. Sizes 2-inch and smaller have union bonnets; sizes 2½ and 3-inch have bolted bon-

nets. Valves up to and including ¾-inch have solid wedge discs; 1-inch and larger have split wedge discs. These valves can be repacked under pressure when fully opened.

Walworth No. 225P Bronze Globe Valves (Angle Type: No. 227P) are rated at 350 psi working steam pressure, 550F; and 1000 psi non-shock service on cold water, oil and gas. The stainless steel, plug type seat and disc — heat treated to 500 Brinell — can be closed on sand, slag, scale and similar floatage, without injury to the seating surfaces. They are the longest wearing, **TOUGHEST** bronze valves you can buy.

For full information about Walworth Quality Bronze Valves, see your Walworth distributor, or write:



WALWORTH
valves and fittings

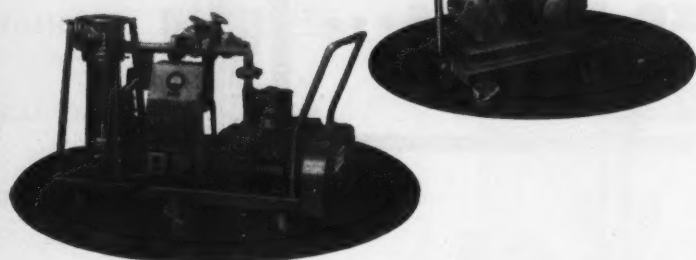
60 EAST 42nd STREET

NEW YORK 17, N. Y.



When inquiring check 9578 opposite last page

for ON-THE-SPOT Vacuum...



YOU CAN'T BEAT A **Kinney**
MOBILE HIGH VACUUM UNIT!!

Kinney MOBILE high vacuum units provide the added efficiency and flexibility so vital in experimental, pilot plant, or production applications. These units are designed with the same engineering skill that has made Kinney pumps synonymous with dependable, trouble-free service . . . offering the highest volumetric efficiency and highest dollar return per CFM available. Request specification data and pumping speed curves.

SMALL UNIT components include: A Kinney KC-5 air cooled pump capable of providing an ultimate pressure of 0.2 Micron-McLeod Gauge, a 1/2 HP motor complete with cord and plug . . . all mounted on a compact, fabricated dolly with tubular handle, swivel casters, and caster brakes. Complete unit weighs only 170 pounds and measures 22 1/2" long, 14" wide, and 22 1/2" high. Handle in upright position measures 36" from floor. Request complete data.

LARGE UNIT components include: A Kinney KC-15 roughing and backing pump, a 4" fractionating diffusion pump with 4" baffle valve, and a Kinney KC-2 holding pump . . . mounted on fabricated base having tubular handle, swivel casters, and caster lock. A 3 station thermocouple gauge (Ion gauge-TC gauge instrumentation optional) and a central control panel are also included. Only utility requirements are cooling water for diffusion pump and single phase 110 volt power supply (extra long service cord supplied with unit).

The Vacuum Equipment Division of The New York Air Brake Company offers complete vacuum engineering service and equipment to suit your present and future needs. Contact a competently staffed Kinney office . . . in Baltimore, Charleston, W. Va., Charlotte, N. C., Chicago (La Grange), Cleveland, Detroit, Houston, Los Angeles, New Orleans, New York, Philadelphia, Pittsburgh, San Francisco . . . or The International Sales Office, 90 West St., New York 6, N. Y.

KINNEY MFG. DIVISION
THE NEW YORK AIR BRAKE COMPANY
3573 WASHINGTON STREET • BOSTON 30 • MASS.
INTERNATIONAL SALES OFFICE, 90 WEST ST., NEW YORK 6, N. Y.

* Please send complete data on Kinney Mobile High Vacuum Units.

Name..... Title.....
Company.....
Street.....
City..... State.....

When inquiring check 9579 opposite last page

ENGINEERING & MAINTENANCE

Dust Control System

(Continued from preceding page)

All of this equipment created dust. Air sample determined that the roaster exhaust passing out through stack was principal source of dust loss. Dust from other equipment and transfer points caused less-than-satisfactory working conditions and an appreciable amount of waste.

Answer to the problem seemed to be dust control system but high temperatures and formation of weak sulfurous acid had to be considered.

Solution: Pure Oil installed system engineered to halt these problems. Dust hoods were placed at all trouble spots and connected by pipelines to a centralized multi-bag filter system. Centrifugal fan moves 7700 cubic feet of air per minute through the system and maintains a pre-determined negative pressure at each pickup point.

All dust particles are trapped as soon as they are created and before they have a chance to escape or settle. Copper oxide particles are collected in the filter bags while cleaned exhaust with no visible dust is sent up the stack. Collected dust is periodically shaken to the bottom of the hoppers and discharged into screw conveyors which take it back to process at the roaster.

Orlon bags were installed to operate at high temperatures . . . around 210°F. Thermostatically controlled air inlet, for emergency use, permits intake of supplementary cooling air in case the temperature in the filter exceeds maximum operating limits. Orlon bags also resist action of weak sulfurous, formed when steam is periodically passed through system and hydrates the SO₂ released by the process.

Results: Continuous operation of the dust control system has allowed a marked reduction in the copper oxide consumption on the order of 700-800 pounds daily . . . around \$350 to \$400 worth. Working conditions have been satisfactorily improved.

(Dust control system was designed and built by The Dracco Corporation, Dept. CP, 4060 East 116th St., Cleveland 5, Ohio. Check 9580 opposite last page.)

(Orlon fiber from which dust collector bags are made is product of Fabric and Finishes Dept., E. I. du Pont de Nemours & Co., (Inc.), Dept. CP, Wilmington 98, Del. Check 9581 opposite last page.)

Construction features illustrated for bonnetless valves

Design features of bonnetless forged steel valves are given in 16-page Catalog 700 issued by Velan Steam Specialties, Inc., Dept. CP, 37 S. River St., Plattsburg, N.Y. When inquiring specify 9582 on form opposite last page.

CHEMPRO TEFLON STOCK of HIGHEST QUALITY VIRGIN POLYMER

You get better, longer lasting parts from Chempro's Teflon® stock, as it is made from only the finest virgin polymer. Cylinders and tape are made from grade TF-5 polymer. This pure, high quality material assures you a denser, more uniform Teflon for greater service life.

For special applications, Chempro Teflon stock is also available glass-filled (FM-2), glass- and carbon-filled (FM-4) or zirconium-filled (FM-8). Our engineering and laboratory facilities are available to help adapt these materials to your needs.



*duPont trademark

THE ORIGINAL FABRICATORS OF
TEFLON PACKINGS AND GASKETS



When inquiring check 9583
opposite last page

CHEMICAL PROCESSING

Catawissa

PERFECT SEAL Unions

HOT FORGED from solid, rectangular steel bars, designed and produced for dependable, long-life service under the severest piping conditions!

A TYPE FOR EVERY USE!
FOR ALL PRESSURES!
FOR ALL TEMPERATURES!



Standard & Double Extra Heavy UNIONS

Available with screwed or socket weld ends. 3000-lb. sizes $\frac{1}{8}$ " to 3"; 6000-lb. sizes $\frac{1}{8}$ " to 2".



ORIFICE UNIONS

With screwed or socket weld ends. 3000-lb. and 6000-lb. service.

MALE & FEMALE UNIONS

With steel-to-steel, bronze-to-steel, stainless steel-to-steel or orifice seats. 3000-lb. service only.



FULL STAINLESS & FULL ALLOY STEEL UNIONS

With screwed or socket weld ends. 3000-lb. and 8000-lb. service.



WRITE FOR CATALOG 56 showing the complete Catawissa line of Perfect Seal Products

CATAWISSA VALVE AND FITTINGS COMPANY
620 Mill St. • CATAWISSA, PA.

When inquiring check 9584 opposite last page

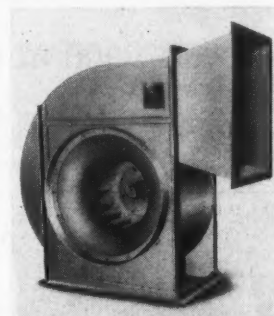
ENGINEERING & MAINTENANCE

High mechanical efficiency obtained by recently introduced series of centrifugal fans . . .

offer three types to meet most industrial needs over a wide range of applications

Series of three fan types offers efficiencies and capacities that will handle most industrial and commercial fan applications requiring heavy duty service.

Type "CR" radial wheel unit offers 78% mechanical efficiency over a broad range. Streamlining and blade design keep turbulence to a minimum. Units are recommended for dust-laden air.



Type "CR" fan has mechanical efficiency of 78%

For higher pressures (total pressures of $6\frac{3}{4}$ " water gage and up) type "BLH" unit maintains a mechanical efficiency of 86%. Fans are available in wheel diameters from $18\frac{1}{4}$ " to $80\frac{3}{4}$ ", have backward-curved blades.

Airfoil blade fans perform at 92% mechanical efficiency in forced draft and industrial air moving service.

All units have a divergent outlet to eliminate turbulence of sudden conversion from velocity to static pressure. Cantilevered variable vanes can be included to provide control of air flow without loss in efficiency.

(Type "CR", "BLH", and Airfoil fans are products of Buffalo Forge Co., Dept. CP, 490 Broadway, Buffalo, N. Y. . . or for more information concerning the manufacturer's product, check 9585 on the convenient Reader Service slip which is located opposite last page.)

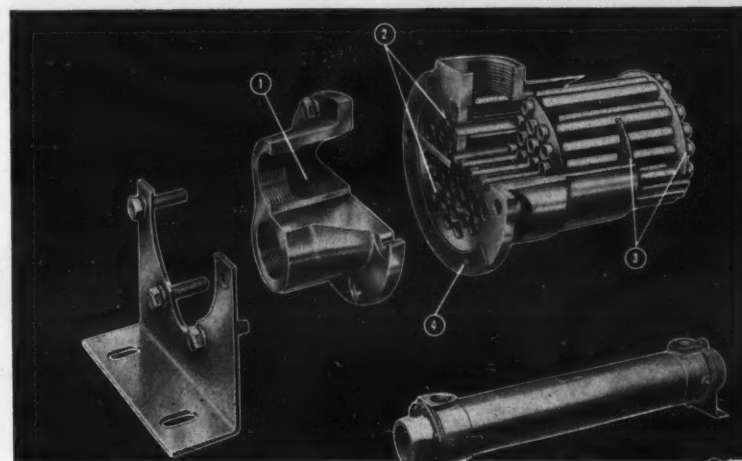
Why is this magazine so "different" in . . .

- type of articles?
- how they're written?
- how they're presented?

Look for the answers on page 171

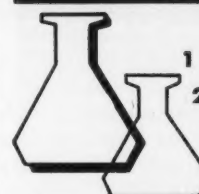
Young Stainless Steel

corrosion-resistant heat exchangers



Type "SSF" Single Pass

Type "SSF" Multipass



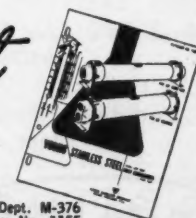
- 1 Smooth flow bonnet distributes fluid with minimum turbulence to tubes.
- 2 Tubes are rolled into headers.
- 3 Baffles made to close tolerance.
- 4 Gasket eliminates by-passing, fluid leakage.

Chemical Pilot Plants Use Young

The challenging and exacting requirements of the Chemical industry as exemplified in its pilot plant operations are met and fulfilled by Young engineering talent. To heat, cool, condense or evaporate liquids and gases, chemical pilot plants need heat exchangers which are compact, economical, dependable and resistant to acids and corrosion. Young Stainless Steel "SSF" Heat Exchangers are the answer to this requirement. These exchangers assure greater initial and operating economies with more cooling surface per unit volume. Young features include factors for fouling and safety, and provide an extra reserve capacity when conditions warrant. Tubes are readily accessible for cleaning. Available in wide range of sizes.

Put **Young Talent** to work for you . . .

Solving heat transfer problems is what we do best because it is our very reason for being. You, too, can harness the power of Young engineering talent. Write, wire or call without obligation.



Write to Dept. M-376 for Catalog No. 1155

Young

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Creative HEAT TRANSFER ENGINEERS FOR INDUSTRY

Heat Transfer Products for Automotive, Heating, Cooling, Air Conditioning, Process, Aviation and Industrial Applications, for Home and Industry.

Executive Office: Racine, Wisconsin, Plants at Berlin, Wisconsin, Madison, Illinois

When inquiring check 9586 opposite last page.

NEW ADJUSTABLE ELECTRIC VIBRATOR



NO WEIGHT CHANGING

A brand new silent electric vibrator that lets you vary the force of vibration without complicated weight changes, The Cleveland Vibrator Company now offers adjustable cams, permitting a change of vibrator force over a 3 to 1 range in a matter of seconds.

With this new bin vibrator you can adjust vibration to exactly fit your bins and type of material you are handling.

No problem when you use a bin for different materials; just change the weight a notch. It's absolutely silent too.

Write for detailed information.

Air or Electric
Portable or Permanent
Silent or Standard



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When inquiring check 9587
opposite last page

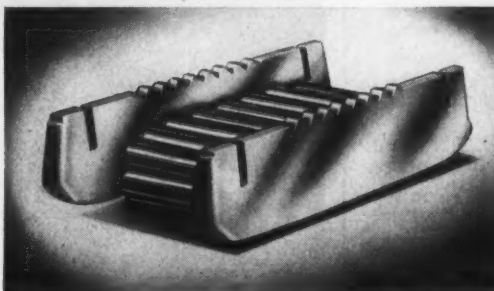
ENGINEERING & MAINTENANCE

Move heavy equipment safely
and easily using roller
that handles 150 tons . . .

device will roll freely without screech or grab

Uses: Handling movement of all heavy machinery in plants and warehouses.

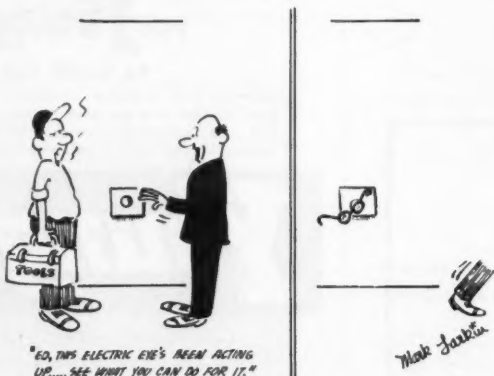
Features: Device rolls easily under heavy loads without grab or screech. It will handle up to 150 tons easily and safely.



Express roller is available in five sizes to handle from two to 150 tons

Description: Unit comprises two main components: a series of moving rollers locked in an endless track and extending above and below a heavy steel frame, and a frame with serrated edges which grip and carry work load being moved. Express roller is available in five ranges of sizes, from two to 150 ton capacities.

(Express Rollers are a product of Express Roller Division, Industrial East Co., Dept. CP, PO Box 561, Clifton, N.J. . . or for more information check 9588 on form opposite last page.)



FULL CONE—HOLLOW CONE—FLAT SPRAY

Spraco has the most complete line of nozzles available anywhere — **IN STOCK**. Capacities range from 1/8 pint/min. to 4000 gal./min. Bronze, cast iron, and stainless steel. Write for our nozzle catalog.



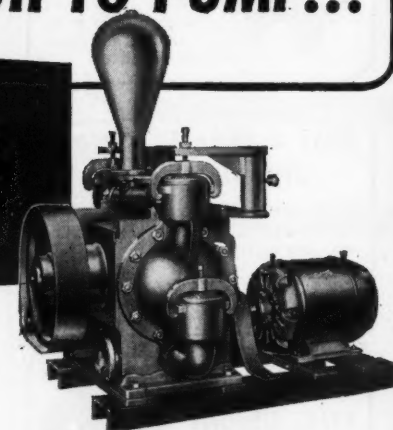
**SPRAY
ENGINEERING
COMPANY**

125 Central St., Somerville, Mass.

When inquiring check 9589 opposite last page

IF IT'S TOUGH TO PUMP...

You need a
**SHRIVER
DIAPHRAGM
PUMP**



for

- ✓ Corrosive
- ✓ Abrasive
- ✓ Viscous
- ✓ Thick • Heavy
- ✓ Delicate
- ✓ Hazardous Materials

Bulletin 137 tells why.

T. SHRIVER & COMPANY, Inc.

Filter Presses • Filter Media • Diaphragm Pumps

846 Hamilton St., Harrison, N. J.

Sales Representatives in
Decatur, Ga.—Houston, Tex.—St. Louis, Mo.
San Francisco—Montreal—Toronto

When inquiring check 9590 opposite last page

CHEMICAL PROCESSING

Coupling problem?

THOMAS will help select your coupling

DOUBLE FLEXING

DBZ—for high speed, heavy duty drives



SINGLE FLEXING

SS—for engine-driven generator sets with out-board bearings



DOUBLE FLEXING

AMR—for engine and medium speed drives



FLOATING SHAFT

BMR—for heavy duty service with excessive misalignment

Your Thomas Sales Engineer, backed by 40 years of coupling experience, will help you select the correct type Flexible Coupling from the Thomas catalog. Or, he will engineer special variations for unusual cases. For all practical purposes, properly installed and operated within rated conditions, Thomas Flexible Couplings will last forever.

NO LUBRICATION • NO MAINTENANCE
THERE ARE NO WEARING PARTS

Under load and misalignment, only Thomas Flexible Couplings offer all these advantages:

1. Freedom from backlash—torsional rigidity
2. Free end float
3. Smooth, continuous drive with constant rotational velocity
4. Visual inspection while operating
5. Original balance for life

Write for Engineering Catalog 51A and the name of the Thomas Flexible Coupling engineer nearest you.

THOMAS FLEXIBLE COUPLING CO.

WARREN, PENNSYLVANIA, U.S.A.

When inquiring check 9591 opposite last page

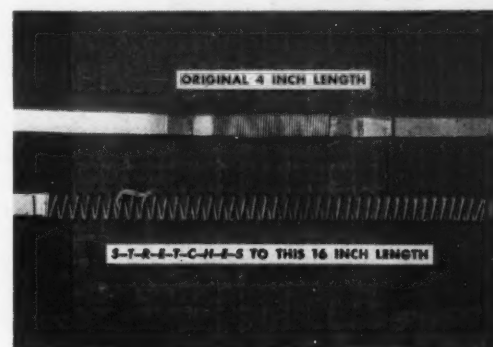
DECEMBER 1956

ENGINEERING & MAINTENANCE

End problem of damaged insulation due to expansion-contraction by using breather springs . . .

a four inch length will expand to 16 inches, has a tensile strength of 275,000 psi

Uses: Fastening magnesia, asbestos, foamed glass, calcium silicate, mineral wool, cork, and sheet metals on surfaces that are subject to expansion and contraction. Units can also be used for vibration damping, tying on insulations under corrosive atmospheres, or high temperature applications (over 1000°F).



Breather springs are available in stainless, Monel, Inconel, or other metals for special applications

Features: Breather springs will expand and contract to follow tank line and hold insulation in place gently but firmly. In original recommended length they are 4" long. At fully-expanded length they measure 16". Springs will not damage insulation or protrude through covering materials due to their 3/8" thickness.

Description: Expandable units can be used with any type bands in widths of 3/8, 1/2, or 3/4", in thicknesses of 0.015 or 0.20". Standard units are made from 0.105" diameter 302 stainless with a tensile strength of 275,000 psi. They maintain excellent spring advantages up to 600°F.

(Breather Springs are a product of Techalloy Co., Inc., Dept. CP, Rahns, Pa. . . or for more information check 9592 on form opposite last page.)

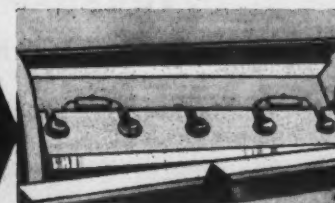
Capabilities of desuperheater subject of folder

Capabilities and specifications of Desuperheater are outlined in four-page, three-color bulletin. Unit is especially good on light loads where, heretofore, control has been difficult.

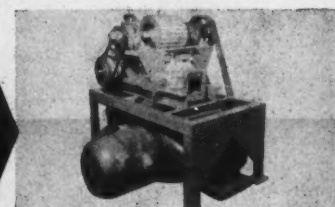
Bul 1024 is issued by Copes-Vulcan Div., Blaw-Knox Co., Dept. CP, Erie 4, Pa. When inquiring specify 9593 opposite last page.

GET UNIFORMLY CUT PELLETS LIKE THIS

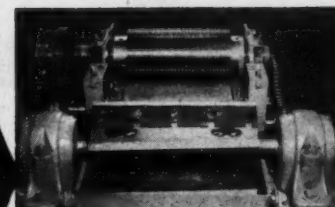
By "Shear" Cutting this way



From Extruded Rods On a Machine like this



Or Sheet Stock On a Machine like this



7 TAYLOR-STILES PELLETERS CUT PLASTIC MATERIALS WITH A SHEARING ACTION

When you pelletize rods or sheet stock on Taylor-Stiles Cutters pellets are of uniform size with no fines—and practically no lumps—resulting in superior performance during extruding and injection molding.

Our many years of experience enable us to combine precisely the right knife bevel, the right relation of fly knives and bed knives, the right circular knives, and the correct shearing angle to ensure clean cut, uniformly sized pellets — by the ton — day in and day out.

Write for four page illustrated brochure 213 describing Taylor-Stiles Pelletizers. No obligation.



20 BRIDGE STREET, RIEGELSVILLE, N. J.

When inquiring check 9594 opposite last page



**TURBO-MIXER, a division of
GENERAL AMERICAN TRANSPORTATION CORPORATION**



Leach Tank Agitators at Vitro Uranium Division of Vitro Corporation, Salt Lake City, Utah.



27" Turbo—Flotation Machines on potash at the Carlsbad plant of the Potash Division, International Minerals and Chemical Corporation.

**high production
low maintenance
with
TURBO
on the job**

Peak production requires *continuous heavy duty service . . .* especially for minerals beneficiation and extractive metallurgy. That's why leading firms such as International Minerals, Nickel Processing, Vitro Uranium and American Smelting and Refining choose Turbo-Mixers.

Many Turbos are on their second 100,000 hours of 24-hour continuous service with no more than normal scheduled maintenance. A Turbo engineer is available to work with your engineers for your *high-production low maintenance program*.

- Send for descriptive information showing how Turbo-Mixers can increase your production efficiency at lower cost.



SALES OFFICE: 380 MADISON AVENUE, NEW YORK 17, NEW YORK
General Offices: 135 S. La Salle St., Chicago 90, Illinois • Offices in all principal cities
**OTHER GENERAL AMERICAN EQUIPMENT:—DRYERS • DEWATERERS
TOWERS • TANKS • PRESSURE VESSELS**

When inquiring check 9595 opposite last page

**engineering and
maintenance**



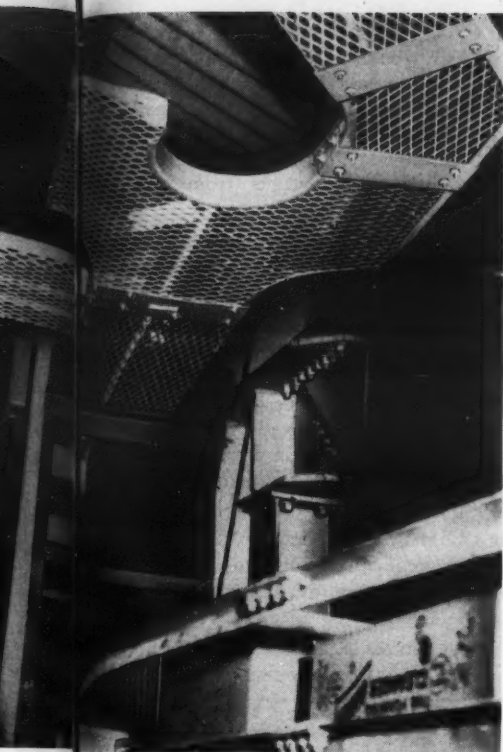
To install control and power circuits for a new warehouse and conveyor lines, Colgate-Palmolive Co. abandoned conduit, and now . . .

**use cable trough
to drop wiring cost**

Saving in labor cost, as much as 50%, and a decrease in materials and space required were a few of the dividends realized by Colgate-Palmolive Co., Jersey City, N. J., when trough replaced conduit in electrical wiring system. Approximately 300 ft of prefabricated expanded metal cable trough is used in company's 368,000 sq ft warehouse, and conveyor bridge connecting it with main plant.

Time was saved in installation because far less trough was needed to provide cable carrying capacity. Eight conduit runs would be needed to carry as much cable as one 12-inch width trough. Cables are laid in trough, eliminating usual "fishing" necessary with closed cable-carrying systems. There is a saving too in supports since a 10-ft section of 12-inch trough weighs 265 lb less than

CHEMICAL PROCESSING

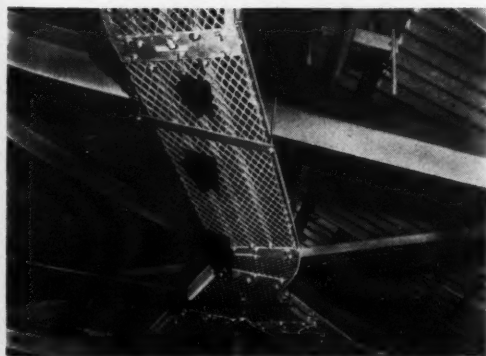


Cable trough system is flexible, side runs and branches can be easily added

equivalent capacity of 4-inch conduit. Since each 10-ft run of trough weighs only 36 lb, a number of sections could be joined and then lifted into position.

Power cable is brought into conveyor bridge through wall of manufacturing plant. It is fed into trough which carries it length of bridge and through warehouse wall to conveyor motor con-

(Please turn to next page)



Barrier strips (arrows) segregate conveyor control circuits from themselves and from main motor feed

17 pump-years of service at \$1⁵² per month for repair parts

The three Type G LaBour pumps in this picture have delivered a total of seventeen years of service to the Sharon Steel Corporation, Sharon, Pa. The first pump was installed in 1948, the second in 1949, and the third in 1953. The pumps are handling pickling solutions at 100° to 120° F.

Sharon Steel Corporation has purchased \$930 worth of parts for these pumps, some of which were spare parts not for immediate use. Counting them all, however, it figures only \$18.25 per pump per year of service.

Since fewer part replacements are required, the true saving made possible by LaBour pumps is greater than the mere comparison of parts cost. Usually the labor and down-time are more costly by far than the parts themselves.

If you're after real economy in pumping corrosive liquids, you'd better look at LaBour. When *all* the figures are in—first cost and maintenance total—after years of service, LaBour is the bargain pump of the field.



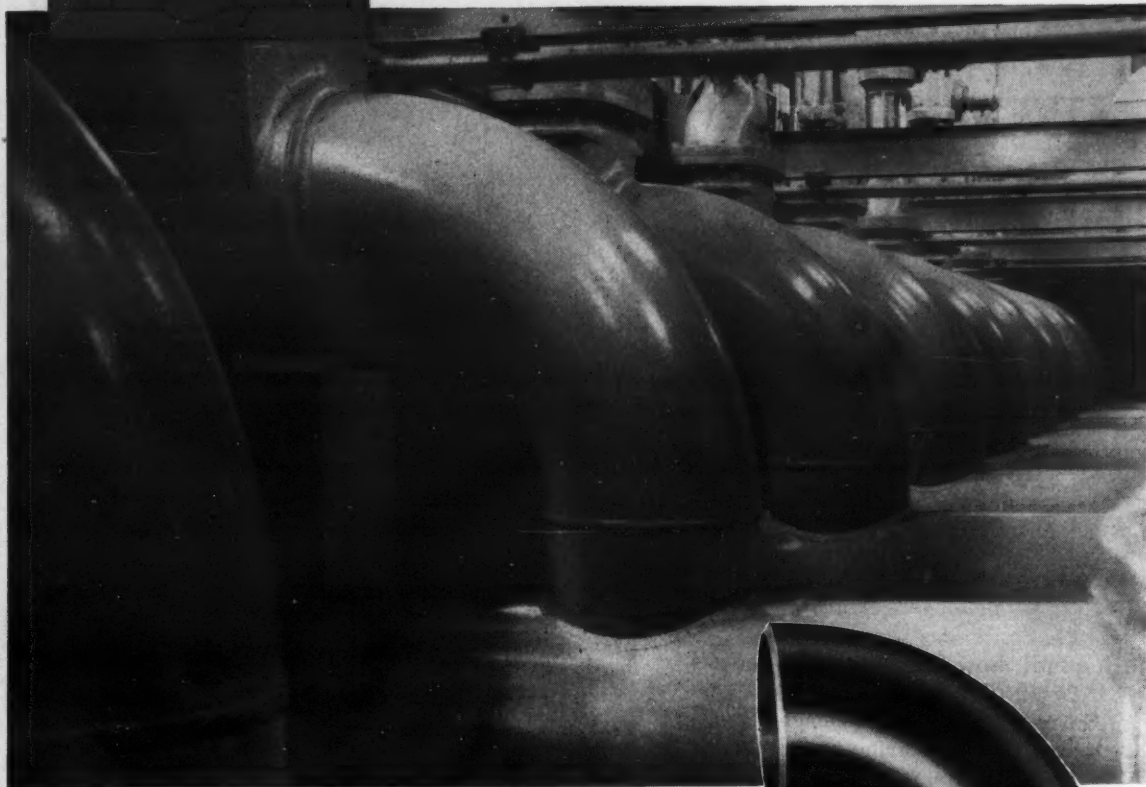
LABOUR

THE LABOUR COMPANY, INC. - GARY, INDIANA, U.S.A.



* When inquiring check 9596 opposite last page

These B&W Elbows Need Less ELBOW ROOM



ELBOW room was at a premium in this piping manifold. Fabricators chose B&W Fittings because they're easy to install, especially in a job like this which calls for "close-quarter" welding. Installation went ahead fast and without trouble, thanks to the accurate dimensions of the B&W Welding Ells used.

Maintenance, too, will be kept at a minimum because, with a sound weld, piping is permanent and leakproof. B&W Seamless Welding Fittings and Flanges are available in a complete range of grades, types, sizes and pipe schedules.

THE BABCOCK & WILCOX COMPANY
TUBULAR PRODUCTS DIVISION • FITTINGS DEPARTMENT
3839 WEST BURNHAM STREET • MILWAUKEE 46, WISCONSIN

THE
NATURAL
SOURCE
FOR ALLOY
FITTINGS



FA-6901

Seamless welding fittings and flanges, seamless and welded tubular products — in carbon, alloy and stainless steels.

When inquiring check 9597 opposite last page

ENGINEERING & MAINTENANCE

Cable Trough

(Continued from preceding page)

trol center. Six-inch trough is suspended overhead and parallel with conveyor line. Further along bridge two additional conveyor lines join first and trough is expanded to 12 inches. Barrier strips inside trough, throughout entire run, separate three control circuits for conveyors from each other and from main motor feed.

Colgate has found that current carrying capacity of cable in troughs may be computed as if cable were suspended in free air; it can carry more current. Trough system helps keep cable cooler.

Changes can be easily made in system whenever necessary. Cable is readily accessible for inspection, repair, rerouting, and replacement. There is no dust problem, and trough needs no maintenance. Observation for more than a year and a half has not revealed any evidence of deteriorated cable insulation.

(Metal cable trough was supplied by T. J. Cope Inc., Dept. CP, Collegeville, Pa. . . . or for more information check 9598 opposite last page.)



"EEEOWW!"

Have you noticed?

CHEMICAL PROCESSING is different in

- ▶ size
- ▶ type of articles
- ▶ how articles are presented

Why?

Maybe you've wondered . . . "Why the unusual size for CHEMICAL PROCESSING? Why don't they use a 'standard' shape?"

Well . . . the reasons for the size of CP come right to you as a reader and how we can make your reading quicker and more profitable. (More about this later.)

But size is not the only "difference" in CHEMICAL PROCESSING. Kinds of articles . . . and how they are written and presented . . . are also different than found in other publications serving the chemical processing industries. Again our "reasons" reach back to you, the reader, and the techniques we can use to get ideas across to you in minimum time.

Let's discuss these "differences" . . . and the reasons behind them . . . more fully.

▶ "DIFFERENT" SIZE

Take another look at CHEMICAL PROCESSING's unique format. Starting with the front cover, leaf through this issue. Note the big pictures, the large, easy-to-follow diagrams and flow sheets, the "Cinemascope spreads." Here is an effectiveness in editorial layout that can't possibly be obtained in the magazines with smaller page size.

You see more, you learn more—more quickly—because of this unique format. Variety and "attractiveness" in layout make the issue more "interesting", more pleasant and less laborious to read.

▶ "DIFFERENT" ARTICLES

You won't find long, drawn-out articles concerned with basics taught in school. But you *will* find concise, factual reports of ways processing men are solving their everyday plant problems. You *will* find to-the-point descriptions of processes, equipment, instruments, chemical materials, and other developments being currently made available to help you improve your operations.

Every effort is expended to get this news across to you in the shortest time, *because you are busy men*. Headlines are written to tell you—in as few words as possible—what the article is about. If it interests you, you can stop and read. If not, you go right on to the next article. No wasted time because you had to read a paragraph or two of the article before you could get the gist.

Here is "post-graduate" editorial for the busy processing man in industry . . . practical, down-to-earth, tightly edited.

▶ "DIFFERENT" PRESENTATION

We've already touched on CHEMICAL PROCESSING's different presentation . . . when we discussed how the large page size helps in layout of articles to make them more "visible" and eye-pleasing. But let's look at some other "differences" in presentation.

Note, as you leaf through the issue, that editorial articles run clear through the magazine. There are no blocks of solid advertising.

Also note that CHEMICAL PROCESSING is sectionalized (see page 4, where the "highlights" of these various sections are listed). You can quickly find the sections that interest you most, read them first, and then page through the other sections later. As far as possible—depending on makeup restrictions—advertising is sectionalized with the editorial articles.

Maybe you've been puzzled about that company name and address, and the "key" number, at the end of editorial articles and advertisements. That's put there as an *editorial service* to simplify your task of getting further information on products and services which interest you. You can write direct to the manufacturer (his complete address is given) . . . or you can check the "key" number on the Reader Service Slip and we will contact the manufacturer for you.

Any comments or suggestions?

As with any successful, growing company, we realize that we must continuously work toward improving our product or service. The comments, pro or con, we get from you readers in the field—by mail or personal contact—are always welcomed and carefully evaluated. These help us in determining what you want to see in your magazine. After all, our job as editors is to give you, month after month, the type of helpful material you need to do your job better and more effectively.

THE EDITORS
OF CHEMICAL PROCESSING



WHY ROCKWELL-Nordstrom VALVES CUT COSTS

Rockwell-Nordstrom lubricated plug valves *stay* leakproof because they do not depend on uncertain metal-to-metal seating. Ordinary valve seats, even on routine services, soon score or pit, resulting in production hazards and costly maintenance.

Rockwell-Nordstrom valves employ *pressurized lubricant* between the plug and body for a tough, continuous seal that assures leakproof service on lightest gases or heavy slurries. The seat is *never* exposed to the line fluid and lubrication protects against corrosive-erosive material . . . maintenance costs are lower than any other valve. Rockwell-Nordstrom valves are always dependable because pressurized lubricant jacks the plug for perfect seating and instant, quarter-turn operation.

You can get Rockwell-Nordstrom valves in semi-steel, steel, stainless and other corrosion resisting metals in a full range of sizes. They cost no more, often less, than ordinary valves. Write for more details: Rockwell Manufacturing Company, Pittsburgh 8, Pa. *Canadian Valve Licensee:* Peacock Brothers Limited.



Rockwell-Nordstrom Valves
LUBRICANT SEALED FOR POSITIVE SHUT-OFF
40th YEAR of lubricated plug valve leadership

When inquiring check 9599 opposite last page

new literature

Much new and revised information in chemistry, physics handbook

Puzzler: How to add 50 pages to a handbook, yet decrease its thickness by 1/2 inch? This year's edition does it — has 3228 pages, is a trim 2 1/2 inches thick.

Subjects that are new or revised this year: Rare earths, heat of formation of organic oxides, specific heats of liquid metals and liquid salts, atomic weights and other data on the elements, pigment properties, and thermocouple calibration information.

To obtain "Handbook of Chemistry and Physics, 38th Edition" remit \$9.50 direct to The Chemical Rubber Co., Dept. CP, 2310 Superior Ave., Cleveland 14, Ohio. When inquiring check 9600 on form opposite last page.

Data sheet tells properties of corrosion inhibitor

A weakly alkaline, cationic, oil-soluble surface-active agent of the oxazoline class, a corrosion inhibitor, is discussed in data sheet. When added to oil, it contributes corrosion inhibition along with its acid-accepting properties.

Tech Data Sheet MD-8 is issued by Commercial Solvents Corp., Dept. CP, 260 Madison Ave., New York 16, N. Y. When inquiring specify 9601 on form opposite last page.

Data on general purpose motors in condensed catalog

Information on manufacturer's line of fractional hp and integral hp general-purpose motors is contained in four-page condensed catalog. Data for single-phase, polyphase, and DC motors, along with frame sizes and motor dimensions are listed. Old and new NEMA related frame cross reference is included.

"Condensed Cat of General Purpose Fractional & Integral HP Motor Prices" is issued by Marathon Electric, Dept. CP, PO Box 630, Wausau, Wis. When inquiring specify 9602 on form opposite last page.

Industrial bulletins pertinent to the reader . . . offering data on products, processes, services. Additional reviews of catalogs, bulletins, data sheets, etc., are found throughout other sections of the magazine

Preparation of petroleum feeds for platinum catalyst

Use of sorptive minerals to perform protective "guard duty" on platinum catalyst reforming feed stocks is discussed in 12-page technical bulletin. The pretreating step protects against losses caused by catalyst poisoning by effectively reducing the constituents that foul the catalyst.

"Preparation of Petroleum Feeds For Platinum Catalysts" is issued by Minerals & Chemicals Corp. of America, Dept. CP, Menlo Park, New Jersey. When inquiring specify 9603 on form opposite last page.

Answers to your questions on vertical turbine pumps

A comprehensive 72-page book, written by a widely recognized authority, answers important questions about use of vertical turbine pumps for municipalities, industry, and irrigation. Selection, installation, and maintenance of pumps for various purposes are treated in an interesting and informative manner.

Actual construction of the well which supplies water to the city of Dallas, Texas is described. The text is supplemented with tables, photographs, drawings, and charts. Plastic ring binder allows any section or sections of the book to be easily removed.

"The Answers to Your Questions About Layne Vertical Turbine Pumps" is issued on letterhead request to Layne & Bowler, Inc., Dept. CP, Memphis 8, Tenn.

Describes operatorless electronic tractor

Battery-powered, electronically controlled tractor that tows trailer trucks over predetermined routes without an operator is illustrated and explained in four-page, two-color bulletin. Schematic of warehouse installation shows layout and operation of guidance system.

Bul 566 is issued by Barrett-Cravens Co., Dept. CP, 628 Dundee Road, Northbrook, Ill. When inquiring specify 9604 on form opposite last page.

**How-to-do-it pictures:
How-to-do-them**

Methods and equipment used for making the many "how-to-do-it" pictures required by industry and business for manuals, catalogs, technical reports, and reference are described in the 62-page, digest-size publication. The planning, making, and finishing phases are covered in detail. Such chapters as preparing the outline, planning a picture series, the picture script, equipment, background, preparing the subject, special photographic techniques, and prints (size, format, quality) are covered in detail.

"How-To-Do-It Pictures," (P-19) may be obtained by remitting 50c direct to Technical Service Bureau, Eastman Kodak Company, Dept. CP, Rochester 4, N.Y. When inquiring check 9605 on form opposite last page.

**Direct air oxidation process
for ethylene oxide discussed**

Eight-page illustrated brochure describes process for producing ethylene oxide by the direct air oxidation of ethylene. Two-page flow diagram of the process is presented. Text includes discussion on history and economics of the process.

"Ethylene Oxide" is issued by the Scientific Design Co., Inc., Dept. CP, 2 Park Avenue, New York 16, New York. When inquiring specify 9606 on form opposite last page.

**DID YOU
BORROW
THIS COPY OF CP?**

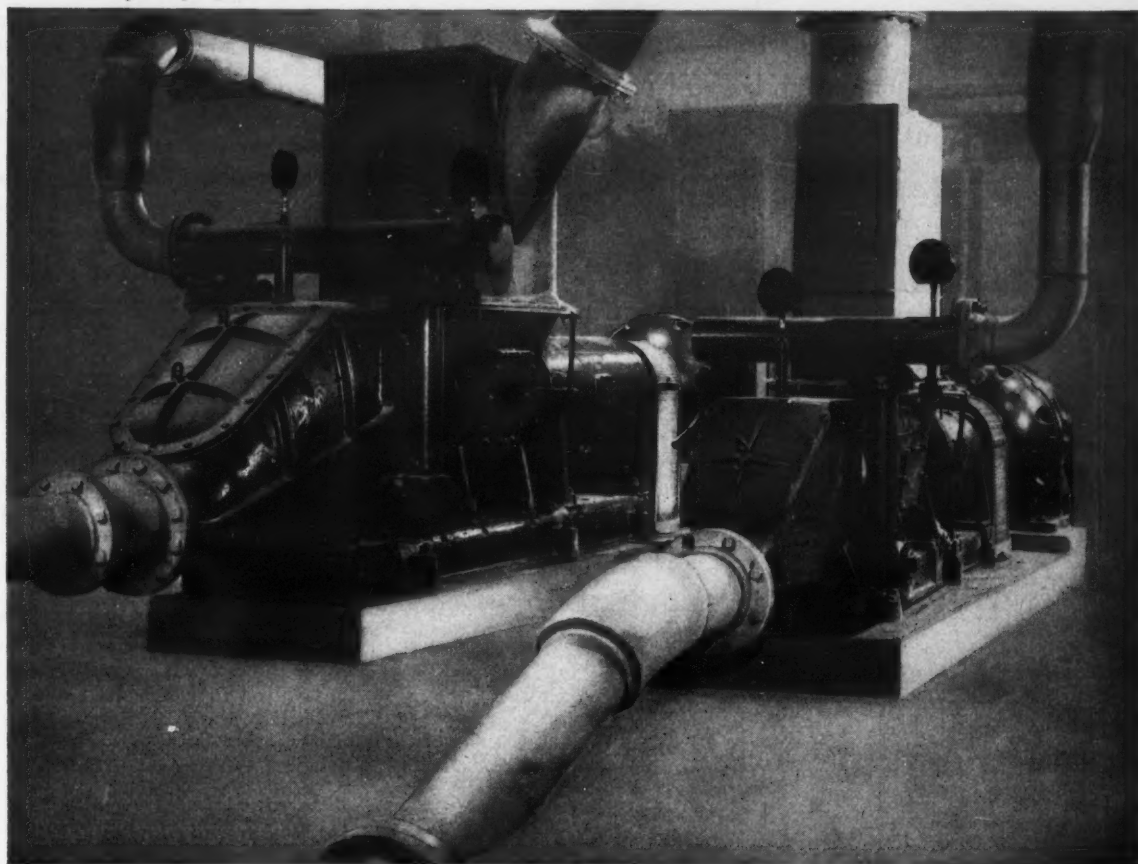
Would you like to receive your own copy regularly . . . for greater convenience in reading?

If you are responsible for processing operations in an administrative, production management, engineering or technical function, it may be possible to send you copies of **CHEMICAL PROCESSING** regularly, without charge.

Complete the request-form opposite the last page of this copy and send it along to us — no obligation, of course.



**MAKING A PROBLEM
... out of your bulk materials handling**



Sure, your dry bulk materials handling system might break down now and then. Yes, maintenance costs do seem to be on the rise. But the materials must be moved even though the handling operation itself adds not a penny to the profit side of the ledger.

Obviously, the solution to all this is to move your materials as efficiently and economically as possible—with a Fuller-Kinyon Conveying System designed specifically for your operations.

Air does the work, conveying to storage, and from storage to packer bins, process, cars, ships

and barges, with maximum efficiency, cleanliness and safety. A Fuller-Kinyon System also will unload from cars, trucks, ships or barges. A one-man operation, with low maintenance, it can be remote or automatically controlled, and used anywhere a pipeline can be run.

Higher, sustained production is possible—and at reduced cost. Write now for the proved-in-service facts about Fuller-Kinyon. A Fuller engineering study of your operations, with recommendations, can be yours without cost or obligation.



FULLER COMPANY

136 Bridge St., Catasauqua, Pa.

SUBSIDIARY OF GENERAL AMERICAN TRANSPORTATION CORPORATION
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P-184
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Fuller

pioneers in harnessing AIR

When inquiring check 9607 opposite last page

ACE offers 100
years experience to

STOP CONTAMINATION

To prevent discoloration, taste, odor or metallic pick-up in your processes, you'll find the best, most economical piping, pumps, valves and tanks among the many ACE rubber and plastic materials. Wide range of temperatures, pressure, impact resistance. Phone nearest American Hard Rubber Company distributor, or write for Technical Data CE-50.

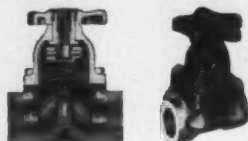
TOUGH ACE-ITE PLASTIC PIPE

General-purpose moderately priced rubber-plastic pipe handles most common chemicals to 170 deg. F. . . except few strong acids and organic solvents. Tough, odorless, tasteless. Rigid pipe 1/2" to 6". Bulletin 80.

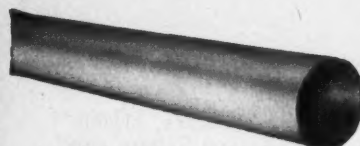


VALVES

for all-plastic piping systems



Trouble-free plastic diaphragm valves . . . choice of general-purpose ACE-ITE, ACE PARIAN (polyethylene) or ACE SARAN. Handles most corrosive chemicals and food ingredients. Sizes 1/2" to 2", 50 psi. at 77 deg. F. Bulletins 80 and 351.



RIGID VINYL . . . STRONG.
AGE-PROOF

ACE RIVICOR is a new rigid threaded plastic pipe with good aging and high impact strength. Not affected by most inorganic acids and alkalis, also excellent for many organics. Sizes 1/4" to 4". Ask for Bulletin CE-56.



1001 USES for ACE-FLEX Tubing

Excellent chemical-resistant, all-purpose flexible plastic tubing. Sparkling clear, easy to clean, odorless, non-toxic, can be steam-sterilized. 3/8" to 1" ID. Bul. 66.



processing equipment of rubber and plastics

AMERICAN HARD RUBBER COMPANY
93 WORTH STREET • NEW YORK 13, N. Y.

When inquiring check 9608 opposite last page

NEW LITERATURE

Film tells story of packaging and carloading tests

Pre-shipment test procedures for packaged products, and basic carloading are presented on 17-minute, 16-mm film in sound and color. Actual humping of railroad cars is illustrated together with the degree of shock to which a loaded car might be subjected during the course of normal transit conditions. Use of Safe Transit label to help reduce in-transit damages is also stressed.

"The National Safe Transit Story" may be purchased or rented from National Safe Transit Committee, Dept. CP, Associations Building, 1145 Nineteenth Street, Northwest, Washington 6, D. C.

Material handling uses of electric fork truck

Information on dimensions, capacities, construction, and uses of electric fork trucks is detailed in two-color, 20-page booklet. Illustrations show trucks in operation on docks, in production areas, and in warehouses. Cutaway drawings depict engineering features of trucks.

"Spacemaster 'E' Model Electric Fork Truck" is issued by Lewis-Shepard Products, Inc., Dept. CP, Watertown, Mass. When inquiring specify 9609 on form opposite last page.

Illustrates laboratory mills for rubber and plastics

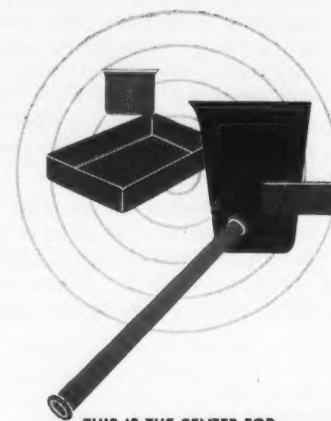
Bulletin of 12 pages and in two colors describes six standard laboratory mills in the 6" x 13" size. Optional design features are discussed which may be incorporated into each mill. Line drawings and specifications of all models are included.

Bul 203 is issued by Farrel-Birmingham Company, Dept. CP, Ansonia, Conn. When inquiring specify 9610 on form opposite last page.

Lubricators listed

Company's complete line of constant level, gravity-feed, and wick-feed oilers are pictured in eight-page catalog. Sizes, capacities, and a brief description are given for each unit. Fuses, fuse pullers, fuse reducers, and test and fuse clip clamps are also listed.

Revised cat 55 is issued by Trico Fuse Mfg. Co., Dept. CP, 2948 N. 5th St., Milwaukee 12, Wis. Specify 9611 opposite last page.



THIS IS THE CENTER FOR

HIGH PURITY FUSED QUARTZ APPARATUS

When critical purity is required for fused quartz and silica laboratory or production equipment, industrial specifications call for Amersil as the primary approved source.

In addition, a unique service is keyed to your requirements. Here, standard apparatus, crucibles, trays, cylindrical containers in a full range of sizes and tubing (up to 25" diam.) are available for early delivery.

Amersil engineers will be glad to assist in developing special equipment to individual requirements. Your inquiry will receive prompt attention.

AMERSIL
COMPANY, INC. FUSED SILICA
AND QUARTZ

685 RAMSEY AVE., HILLSIDE 5, NEW JERSEY

ENGELHARD INDUSTRIES

When inquiring check 9612
opposite last page

CHEMICAL PROCESSING

Shows design of block heat exchangers

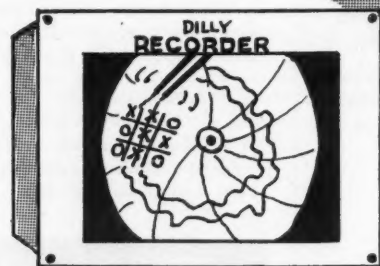
Illustrations in four-page, two-color folder show assembled and disassembled units and cross-section view, of block heat exchangers. Various models available and technical data on performance are included. Single units have four to 200 sq ft of surface.

Cat 456 is issued by Delanium Graphite Co., Dept. CP, 134 Elmora Ave., Elizabeth, N. J. Specify 9613 opposite last page.

Fats and oils — seed or tallow to finished product

Processes and equipment for extraction and recovery of animal and vegetable fats and oils are described and illustrated in 24-page, two-color bulletin. Processes covered include extraction, refining, distillation, deodorization, fat splitting, hydrogenation, and fatty-acid separation. Tables list performance and economics of typical installations.

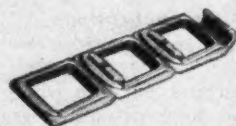
Bul 2515 is issued by Chemical Plants Division, Blaw-Knox Company, Dept. CP, Box 778, Pittsburgh 30, Pa. When inquiring specify 9614 on form opposite last page.

**60 YEARS OF SPECIALIZATION MAKES**

Moline chain

best by any job test

MOLINE makes just one thing—the world's finest malleable chain. The superiority of this chain has been established by 60 years of specialization. Moline engineers and technicians confine their efforts to improving design and refining manufacturing techniques—to produce chain that will give maximum efficiency . . . trouble-free performance . . . long life. And only Moline chain is triple-tested. That means Moline chains undergo rigid physical testing, visual inspection and gauging by experts. Then, after assembly, they are stressed to proof strength and shock tested for soundness. Be sure to *specify Moline Chain*, malleable or promal, for conveying, elevating and power transmission services. Write today for catalog.



DETACHABLE CHAINS



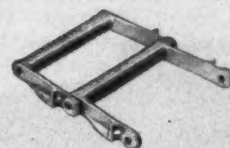
PINTLE CHAINS



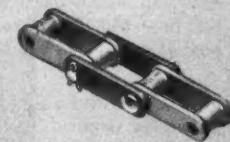
LONG PITCH PINTLE CHAINS



LEY BUSHED CHAINS



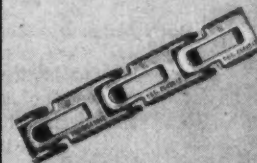
REFUSE CHAINS



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Specializing in the manufacture of chain

LEADERS
FOR
60 YEARS

When inquiring check 9615 opposite last page

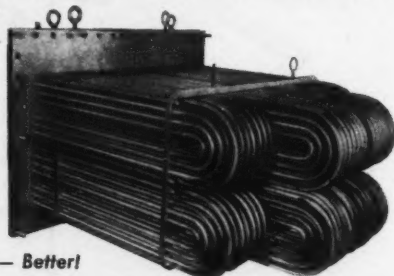
Why your Paracoil corrosion-resistant heat exchanger

won't "get weak in the knees"



...or at the joints either. Corrosion-resistant materials have a habit of losing their corrosion-resistant properties at critical points if not properly fabricated. But Davis Engineering's skill and experience in metals and alloys insures you Heat Exchange Equipment with constant corrosion-resistant strength... especially at the "knees".

Davis Engineering is prepared to meet all your requirements for heat exchangers and process equipment by designing and fabricating equipment in bronze, copper, Monel, Inconel, carbon and stainless steels, nickel and aluminum.



Davis Makes It - Better!

All stainless steel, type 316, tube bundles and tube sheet... typical of how Davis Engineering solves your difficult and special fabrication problems.

Write for Bulletin 1000

DAVIS ENGINEERING CORPORATION

30 Rockefeller Plaza, New York 20, New York Circle 6-5650
1064 East Grand Street, Elizabeth 4, New Jersey Elizabeth 2-6780

When inquiring check 9616 opposite last page

NEW LITERATURE

Three chemical-resistant coatings described in bulletin

Four-page, illustrated bulletin gives information on three general classes of corrosion-resistant organic coatings. One is a coating system for general corrosion control, the second a plastisol for heavy-duty service, and the third special coatings for lining steel drums and tanks.

Bul Chem C-2 is issued by Metal & Thermit Corp., Dept. CP, Rahway, N. J. When inquiring specify 9617 on form opposite last page.

On tubing made from stainless, nickel, nickel alloy

Twelve-page brochure describes tubing ranging in size from 0.008 to 1.000" OD made from stainless steel, nickel, and nickel alloy. Number of other tubular fabricated parts are also covered.

Bulletin on tubing is issued by Stainless Steel Products Div., J. Bishop & Co. Platinum Works, Dept. CP, Malvern, Pa. When inquiring specify 9618 on form opposite last page.

Illustrates applications of wheel conveyors

Fixed and portable wheel conveyors used to move, store, or unload large and small objects with smooth, flat bottoms are covered in six-page catalog. Photographs depict and describe types of installations. Information on complete line of pre-engineered and custom conveyors is included.

Cat LR-56 is issued by The Alvey-Ferguson Company, Dept. CP, Cincinnati 9, Ohio. When inquiring specify 9619 on form opposite last page.

Illustrates wide variety of crushers

Different types of grinders, shredders, choppers, and other types of crushing equipment are illustrated and described in four-page bulletin. Units can be furnished as standard items or custom-built to meet requirements for size reduction of products with many varying characteristics.

Bul 1a is issued by American Pulverizer Co., Dept. CP, 1139 Macklind Ave., St. Louis 10, Mo. When inquiring specify 9620 on form opposite last page.



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*Trademark Reg. U.S. Pat. Off.

When inquiring check 9621
opposite last page

CHEMICAL PROCESSING

Administrative problem solving— Air Force study

Report on Air Force research into the differences among its personnel in ability to solve complex administrative problems is detailed in 86-page book. Interpretation of results indicates that effectiveness in solving many types of administrative problems depends on a complex relationship between intellectual skills and motivation. Further, incentives produced by working conditions may affect consistency in problem-solving ability.

To obtain Report PB 121071, "Some Conditions Affecting Quality, Consistency, and Predictability of Performance in Solving Complex Problems," remit \$2.25 direct to Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C.

Lists available bulletins on nuclear equipment


Bulletin of four pages lists technical bulletins available from company on nuclear equipment including instruments for sample preparation, counting, and personnel protection.

Bul N103 is issued by Nucleonic Corporation of America, Dept., CP, 196 De Graw St., Brooklyn 31, New York. Specify 9622 opposite last page.

Tells about the improved impact of phenolic for molding

Physical properties, application data are presented for GE 12906 black phenolic molding compound. Advantages due to its high impact strength are pointed out.

Bul CDC-325 is issued by Chemical Materials Dept., General Electric Co., Dept. CP, 1 Plastics Ave., Pittsfield, Mass. When inquiring check 9623 on form opposite last page.



have you noticed?

CP is "different" in regards to type of articles it contains. For reason why . . .

. . . see page 171

How Steam Trap Standardization *reduces* Installation and Maintenance Work and Cost

No Bypasses Needed. Traps can be replaced in a couple of minutes by uncoupling the unions and installing a "spare" trap complete with proper length pipe connections and half unions.

| ORIFICE SIZES | |
|---------------|------|
| PRESSURE | SIZE |
| 0-40 | 1/2" |
| 40-60 | 3/4" |
| 60-150 | 1" |

CAPACITY=0-300"/HR

NOTES:

DIMENSIONS SHOWN ARE FOR MINIMUM SPACE INSTALLATION.

IN LONG RUNS - PIPE TO BE PITCHED TOWARD TRAP.

TRAP TO BE INSTALLED BELOW DRAIN POINT IF POSSIBLE. IF NOT POSSIBLE, A CHECK VALVE MUST BE INSTALLED ON INLET SIDE OF TRAP.

Standardized hookup includes test valve for trap testing, strainer, blowdown valve for cleaning trap, shut-off valves and unions for quick replacement.



ARMSTRONG MACHINE WORKS, 880 Maple Street • Three Rivers, Michigan

ARMSTRONG STEAM TRAPS

When inquiring check 9624 opposite last page



Trap Maintenance Costs Reduced \$25,000 per Year with Armstrongs

Major reductions in steam trap installation and maintenance work and cost can be achieved by standardization on one make of trap which, in turn, permits standardized hookups. A major chemical company reports an annual maintenance saving of \$25,000 since installing 4000 Armstrong traps according to the drawing and photograph shown here. Additionally, trap parts inventory is reduced and purchasing is simplified.

Traps of a Size Interchangeable. Note that exact dimensions are given for the pipe fittings, including nipples connected to each size of trap. When a trap needs repair, the unions can be uncoupled, the trap lifted from the line, and a "spare" carrying identical pipe connections slipped in place. In as little as one or two minutes, a faulty trap is replaced. It is then repaired and takes its place as a "spare".

\$25,000 Trap Maintenance Saving. Records on the Armstrong trap installation described here show that the cost of repair parts was approximately \$10,000 less annually than with the traps previously used. Reduction in maintenance labor brings the total saving to \$25,000, per year. And, fuel savings attributable to the traps are at least equal to the maintenance saving.

FOR COMPLETE INFORMATION on the traps that slash maintenance costs ask for the Armstrong Steam Trap Book containing complete data plus selection, installation and maintenance recommendations. Call your local Armstrong Representative or write.





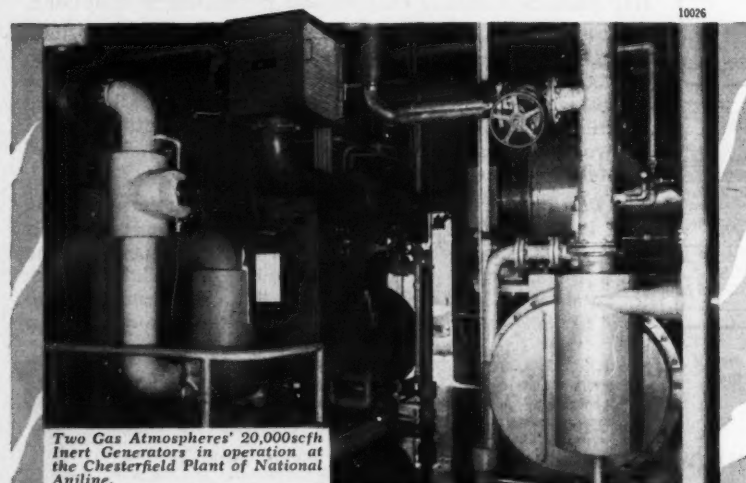
Gas Atmospheres' 6000 scfh Inert Generator with refrigerant dryer, compressor and dessicant dryer designed and built for National Aniline.

National Aniline relies on Gas Atmosphere Generators

When the woman buyer wants something white—she means "whiter." This desire for whiter whites has chemists, textile people, synthetic fiber manufacturers and soap and detergent makers, among others, in a constant search for methods and processes that will enable them to achieve brighter whites.

National Aniline Division of Allied Chemical and Dye Corporation has developed a way for manufacturing "extra white" nylon. A big part of their method is keeping oxygen away from the nylon as long as possible. They do this by blanketing process vats and purging lines with an inert gas of their own manufacture.

To get the finest gas generation possible National Aniline selected a Gas Atmospheres' Inert generation. Its performance has resulted in the purchase of two additional Gas Atmospheres' units that give National Aniline all the inert gas they need at remarkably low cost.



Two Gas Atmospheres' 20,000scfh Inert Generators in operation at the Chesterfield Plant of National Aniline.

gas Atmospheres, inc

equipment for producing industrial gases
20011 WEST LAKE ROAD CLEVELAND 16, OHIO

When inquiring check 9625 opposite last page

NEW LITERATURE

Nuclear products and facilities reviewed in bulletin

Products, fabrication services, and facilities of manufacturer's nuclear products division are illustrated and described in six-page folder. Products listed include specially-shaped control rod channels, assembly channels, and control rods. Bulletin also describes engineering service available for setting up manufacturing facilities and inspection controls following prototype development.

Bul 200 is issued by Nuclear Products Division, Superior Tube Company, Dept. CP, Norristown, Pennsylvania. When inquiring specify 9626 on form opposite last page.

Comparative coatings chart guide for engineers

Chart which shows the comparative chemical resistance of different classes of coatings such as vinyl, epoxy, chlorinated rubber, and others should be quite useful to the coatings engineer.

"Comparative coatings chart" is issued by J. Landau Co., Dept. CP, Carlstadt, N. J. When inquiring specify 9627 on form which is located opposite last page.

Catalogs modelmaking components

Items most commonly used in the field of engineering modelmaking are listed and described in 28-page catalog. Included are such components as valves, fittings, piping, scale figures, vessel foundations, ladders, vessel heads, etc.

Modelmaking component catalog is issued by Engineering Model Associates, Dept. CP, Box 22020, Los Angeles 27, California. When inquiring specify 9628 on the convenient Reader Service slip which is located opposite last page.

Explains uses, features of tubing spirally cabled and armored

Technical bulletin of 12 pages gives two-color illustrations of spirally-cabled, armored tubing. Detailed data are provided on standard armored units and specific instructions given for handling under all possible conditions. Illustrations show regular copper and polyethylene tubes, as well as four different corrosion-resistant types.

Bul 356 is available from Crescent Insulated Wire & Cable Co., Dept. CP, Trenton, N.J. When inquiring specify 9629 on form which is located opposite last page.

Polyvinyl Alcohol users can count on

3 Big Benefits

from buying Colton

VINOL
POLYVINYL ALCOHOL

- ① Continuous, uninterrupted source of supply
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- ③ Spot delivery from convenient warehouses

Colton chemists are ready, willing and able to show you the advantages in product improvement and cost reduction of Vinol Polyvinyl Alcohol . . . for water soluble films for up-to-the-minute packaging . . . for new paper and textile coatings . . . as an emulsifier for producing stable emulsions of many resins . . . as a binder in industrial ceramics.

Write now for samples and data to Dept. C83

SPECIFICATIONS

VINOL Polyvinyl Alcohols now available in the following grades:

PA-5, PA-20, PA-40
(88% hydrolyzed)

Low, medium and high viscosity partially-acetylated grades.

FH-100, FH-400, FH-500, FH-600
(99+ % hydrolyzed)

Low, medium, medium high and high viscosity fully-hydrolyzed grades.



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Products of other divisions of Air Reduction Company, Inc. include: AIRCO, industrial gases, welding and cutting equipment • PURECO, carbon dioxide, liquid-solid ("DRY-ICE") • OHIO, medical gases and hospital equipment • NATIONAL CARBIDE, pipeline acetylene and calcium carbide.

When inquiring check 9630 opposite last page

CHEMICAL PROCESSING

Disaster electrical repair plan speeds plant recovery

Facilities and methods for electrical repairs to help speed plant recovery following an emergency are detailed in 12-page, two-color bulletin. Suggested procedures for recovery of vital electrical equipment damaged by flood, fire, wind, and other disasters serve as guide in helping industries and utilities resume production quickly. Specific case histories show how industries and utilities were aided. Information on productive maintenance program to minimize equipment breakdowns and increase production is included. Directory shows location, address, and phone numbers of 52 service shops located from coast to coast.

Bul GEA-6484 is issued by General Electric Company, Dept. CP, Schenectady 5, N. Y. Specify 9631 on form opposite last page.

Details battery development for lift trucks

Batteries developed to fill all power needs of electric fork-lift trucks are described in eight-page, two-color bulletin. Full details of construction, including tightly sealed posts, basic Z grids, regenerative oxide material, highly porous plate encirclements, glass retainers, rubber separators, and element protectors are given. Bulletin contains complete engineering specifications for 40, 60, and 120 ampere-hour capacities. Lengths and widths for groupings of cells in wood or steel trays on rider-type trucks are tabulated.

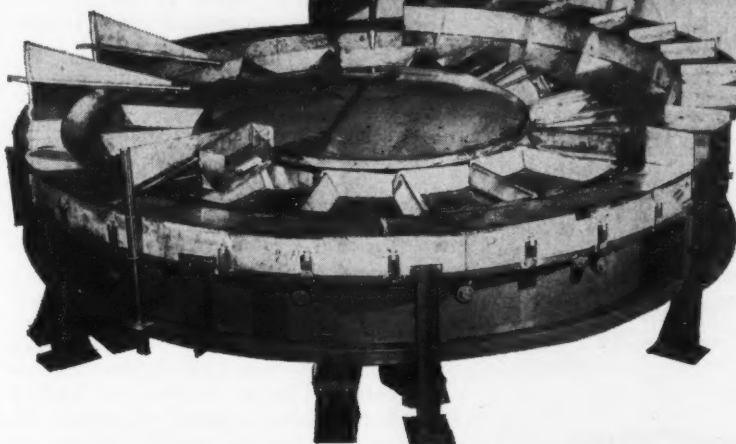
Bul GB 1668-B is issued by Gould-National Batteries Inc., Dept. CP, Trenton 7, N. J. When inquiring specify 9632 on form opposite last page.

Diaphragm valve operation basic methods shown

Description of diaphragm valves in terms of their advantages, applications, and specifications is covered in 12-page, two-color catalog. Three basic operations of company's diaphragm valves are shown, and basic valve model dimensions are listed. Cutaway photographs illustrate design and accessibility for servicing. Information on plastic bodies and diaphragms is included.

Cat 100 is issued by Hills-McCanna Company, Dept. CP, 3025 North Western Ave., Chicago 18, Ill. When inquiring specify 9633 on form opposite last page.

HIGH CAPACITY CLEAN DISCHARGE WITH EIMCO PAN FILTERS



Detail of Eimco stainless-steel pan-filter showing flexible vacuum and blow connections to each pan. These are exclusive features on the Eimco Pan Filter — particularly advantageous when the slurries filtered require periodic clean-outs of internal parts.

Greater filtering capacity, cleaner discharge and superior washing and drying make the Eimco Pan Filter a highly efficient unit.

Each pan functions as an individual filter with feed, wash, dry and discharge cycles. The pans may be jet washed from the bottom, assuring a clean media during every revolution.

Eimco Pan Filters can be constructed from a wide range of materials to ensure long life and low maintenance when processing corrosive slurries. Materials

such as rubber, plastic and many others may be bonded to the surface of the metal construction for protective coating or to prevent product contamination.

Pan filters are available in a variety of sizes from 10 to 500 square feet of filter area.

These and other outstanding features listed below in a comparison with table filters, make the Eimco Pan Filter the most practical and efficient horizontal type vacuum filter available.

| | TABLE FILTERS | EIMCO PAN FILTERS |
|---------------------------|--|--|
| Cake Discharge | Heel of cake remains on media. | Clean, full cake discharge. |
| Washing | No clear separation of wash. Cake remaining on media carries liquor past cake discharge point, diluting the strong filtrate. | Absolute separation of wash. |
| Media | Becomes blinded easily. Must stop to remove cake and wash. (Phosphoric acid operation requires considerable downtime.) | Media kept clean through wash during each cycle. Downtime minimum. |
| Removing, Repairing Media | Difficult repair job. | Media on each pan is easily and quickly changed or repaired. |

Let Eimco engineers consult with you on your filtration problem. For years they have made it their business — through research — to offer better liquid-solid separation through filtration.

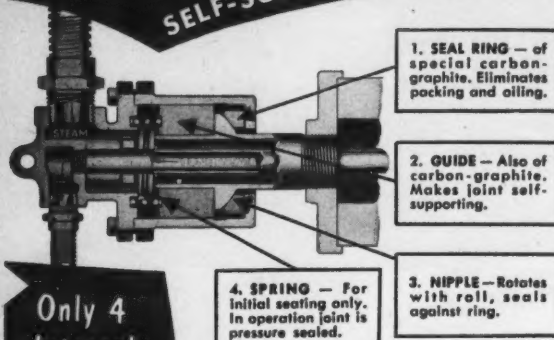
THE EIMCO CORPORATION
Salt Lake City, Utah—U.S.A. • Export Offices: Eimco Bldg., 52 South St., New York City

New York, N. Y. Chicago, Ill. San Francisco, Calif. El Paso, Tex. Birmingham, Ala. Duluth, Minn. Kansas City, Mo. Baltimore, Md. Pittsburgh, Pa. Seattle, Wash. Portland, Ore. Houston, Texas Vancouver, B. C. London, England Ootahood, England Paris, France Milan, Italy Johannesburg, South Africa



When inquiring check 9634 opposite last page

JOHNSON Rotary Pressure JOINT SELF-SUPPORTING TYPE



Only 4
Internal
Parts

1. SEAL RING — of special carbon-graphite. Eliminates packing and oiling.

2. GUIDE — Also of carbon-graphite. Makes joint self-supporting.

4. SPRING — For initial seating only. In operation joint is pressure sealed.

3. NIPPLE — Rotates with roll, seals against ring.

For introducing steam and liquids into rotating rolls and cylinders, there's nothing like the Johnson Joint above. It's packless, self-lubricating, self-adjusting, self-supporting. It has been

adopted by dozens of machinery makers, and is finding new uses every day.

Type S8 shown handles both steam and condensate through same head; also available for through flow service, and in sizes and styles for all operating conditions. Write for literature.

The Johnson Corporation

826 Wood St., Three Rivers, Mich.

When inquiring check 9635 opposite last page

sure cure

FOR

destructive
water hammer

JOSAM SHOCK ABSORBERS

The pounding, shaking noise you hear in your pipe lines is "Water Hammer" — as destructive as it is noisy — loosening fittings, damaging valves and appliances, and causing expensive repairs!

JOSAM SHOCK ABSORBERS easily, inexpensively and permanently "cure" hammering and vibration in pipe lines. Send coupon today for latest scientific data.



JOSAM MANUFACTURING CO.
Dept. CP • Michigan City, Indiana

Please send free copy of Manual "S" on WATER HAMMER

Firm
By Title
Address
City Zone State

When inquiring check 9636 opposite last page.

NEW LITERATURE

**Bulletins describe water, sewage
and waste treating equipment**

Trickling filtration process and equipment for waste are explained in 12-page bulletin, with drawings and photographs of installations. Eight-page bulletin, with illustrations, discusses performance, operation, and economy characteristics of activated sludge plant.

Modernization of overload activated sludge plant is described. Factors that influence clarification and solids separation are covered in 16-page bulletin on clarifiers and thickeners. Drawings and photographs illustrate installation, operation, and construction of equipment.

Bul 6200-A, "The Accelo Filter;" Bul 6550-A, "The Biosorption Activated Sludge Plant;" and Bul W-800-C — S-6000-C, "Clarifiers and Thickeners" are issued by Infilco, Inc., Dept. CP, PO Box 5033, Tucson, Ariz. When inquiring specify 9637 on form opposite last page.

**Plastic tube and rod —
24 pages of data**

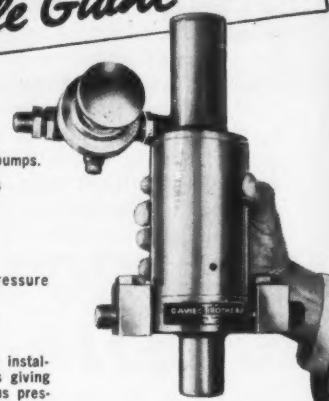
Rod and tube made from crystal clear methyl methacrylate, Teflon, cast acrylic, vinyl, polyethylene, cellulose acetate, and polystyrene are described in 24-page, two-color catalog.

"Plastic Rod & Tube Catalog" is issued by Friedrich & Dimmock, Inc., Dept. CP, Lincoln Ave., Millville, N. J. When inquiring specify 9638 on form opposite last page.



8 reasons why you should switch to —

AIR-HYDRO-PUMP Jr.
"The Little Giant"
FOR PRESSURE
TESTING
10,000 PSI
(with air-100 psi)



1. Operates more quickly and efficiently than hand pumps.
2. A turn of the wrist gives instant pressure.
3. Saves man hours.
4. Eliminates fatigue.
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6. Ideal for testing valves and fittings.
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8. Ideal as source of hydraulic power for operating small presses, jacks, rams, clamping devices and other hydraulic mechanisms.

SIX JUNIOR MODELS
100 PSI TO 10,000 PSI

\$185.00

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Also Complete Range of 35 Standard
Models, Single or Double Acting

DAVIES BROS. 120 WALL ST., N.Y. 5, N.Y.

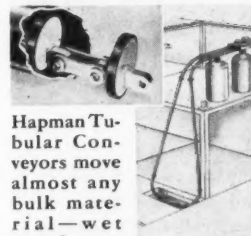
When inquiring check 9639 opposite last page

HERE'S HELP

THAT SOLVES TROUBLESOME
BULK HANDLING PROBLEMS:

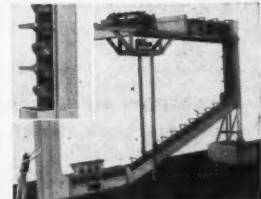
Hapman

Tubular and Pivoted Bucket Conveyors



Hapman Tubular Conveyors move almost any bulk material — wet or dry — through any plane or angle. They're dust, liquid and odor-tight. Investigate!

WRITE for Bulletin T-C126



Exclusive top loading device on Pivoted Bucket Carrier handles fragile materials gently. Many other unique advantages.

WRITE for Bulletin P-C126

Hapman CONVEYORS, INC.
DIVISION HAPMAN-DUTTON COMPANY

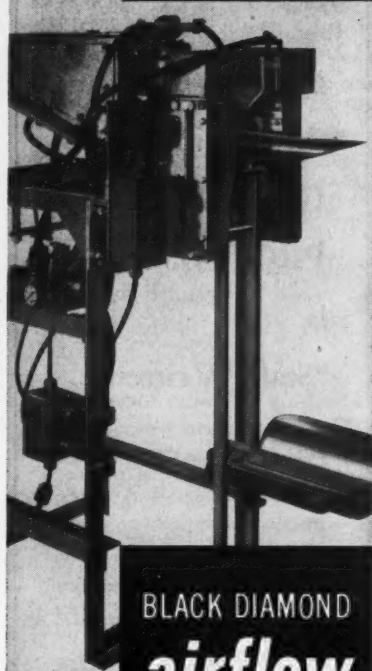
KALAMAZOO MICHIGAN

In British Commonwealth & Europe: Fisher and Ludlow Ltd., Birmingham

When inquiring check 9640 opposite last page

CHEMICAL PROCESSING

For trouble-free
GUARANTEED
packing performance



BLACK DIAMOND
airflow
valve bag packer

The **BLACK DIAMOND AIRFLOW PACKER** makes use of the fluidizing principle of conveying material. This principle in combination with a newly developed integral scale mechanism has resulted in an automatic, controlled weight bag filling device which is the latest and final answer to many valve bag filling operations.

Automatic accurate weight (plus or minus 2 ounces not uncommon).

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13513 CALUMET AVE., CHICAGO 27, ILLINOIS
DEPT. P2

West coast plant: 8858 Calabash Ave., Fontana, California

MANUFACTURERS SINCE 1912

When inquiring check 9641
opposite last page

NEW LITERATURE

Electrodeposition process for titanium

Development of an effective method for the electro-deposition of titanium, sponsored by the Air Force, is described in three-part report. Part 1 (PB111797—57 pages) reports on experiments concerning electrolysis of both fused salt and aqueous systems. Part 2 (PB-111798—57 pages) reports development of a method for obtaining high-content diffusion coatings of titanium by immersing a metal in a fused chloride bath in close proximity to solid plates of titanium or a concentration of titanium powder. Part 3 (PB111794—59 pages) describes modification of the coating procedure to a more effective and reproducible process by introduction of small controlled amounts of oxygen into the fused chloride bath.

For each part of "The Electrodeposition of Titanium", remit \$1.50 to Office of Technical Services, United States Department of Commerce, Washington 25, D. C.

Shows how digital techniques can be used

Booklet of 16 pages shows graphically how digital techniques, using pulse control units, can be applied in testing, information handling, and control. Practical applications in coding, frequency, simulation, and arithmetic operation are discussed. Series of die-cut pages illustrate graphically how a single combination of pulse control units can be re-arranged in a number of ways.

"Four Dimensions" is available on letterhead request to Electronic Instruments Division, Burroughs Corporation, Dept. CP, 1209 Vine Street, Philadelphia 7, Pa.

Describes accident causes and suggests prevention

Causes of accidents and how company's safety program eliminates hazards are explained in a 16-page booklet. Subjects such as protective equipment, machine guards, signs, safety rules, safety glasses, use of ladders, safety shoes, electric truck operation, fires, use of hand rails, plant house-keeping, and cost of accidents to individual and company are covered. Pocket in back cover is provided to keep envelope stuffer-type bulletins issued to employees periodically. Limited number of copies are available to companies interested in preparing a similar booklet.

"Safety at the Norton Company" is issued by the Norton Company, Dept. CP, Worcester 6, Mass.

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CAMCO

Light Weight

**FORGED CARBON STEEL
BACK-UP FLANGES**
FOR LOW PRESSURE SERVICE



All surfaces protected
with baked enamel finish.

Our line of FORGED CARBON STEEL BACK-UP FLANGES have found wide acceptance in stainless and other alloy piping installations of lightwall pipe. (Schedules 5 & 10.) We believe the economy effected by their use warrants your consideration.



For further details
Ask for schedule
FCS-856

FREE!



CAMCO Products, Inc., 445 State Street
North Haven, Conn. CP

- ☐ Please send Flange Dimensional Slide Rule.
- ☐ Send literature covering complete line.
- ☐ Furnish address of area distributor.

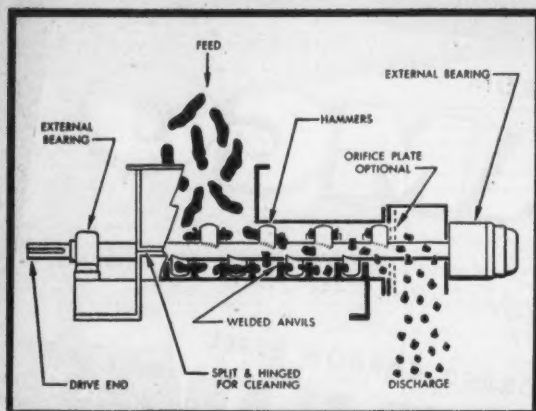
Name _____
Company _____
Address _____
City _____ State _____



**445 State Street
North Haven, Conn.**

When inquiring check 9642 opposite last page

... the answer to many problem jobs in



CRUSHING HOGGING GRINDING

of
extremely large
and/or
tough materials

MIXING BLENDING

RIETZ PREBREAKERS

Models for Many Purposes

CAPACITIES: ½ to 60 Tons per Hour
MOTORS: 1 HP to 100 HP
SPEEDS: 10 RPM to 600 RPM

Rietz Prebreakers successfully replace equipment of much higher horsepower and function with lower maintenance cost.

Send your problem materials to Rietz for free testing on Rietz equipment. Processed samples and a full report will be returned to you.

ENGINEERING OFFICES IN PRINCIPAL CITIES



MANUFACTURING CO.
Santa Rosa, Calif. West Chester, Penn.

When inquiring check 9643 opposite last page



THE Hydrolectric LIFT TRUCK

pays for itself ...
with the savings it makes



- 2 Drive Wheels instead of one
- 2 Braking Systems available instead of one
- 4 Wheel Stability instead of three
- Alloy Gear Transmission instead of chains
- 100% more Steering Ease—Greater Maneuverability
- 50% less Maintenance—Easy Accessibility
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The ease of operation, speed, safety, power and economy of Hydrolectrics, users report, make it possible for them to pay for themselves five to twelve times per year.

The exclusive Hydrolectric modern features give you top performance day in and day out the year around, which today's material handling requires, at the lowest cost.

Write for complete information today!

STUEBING Designed • Engineered • Built

LIFT TRUCKS, INC. / CINCINNATI 14, OHIO



THERE IS A TRUCK FOR EVERY PURPOSE TO HANDLE ANY KIND OF MATERIAL.

When inquiring check 9644 opposite last page

NEW LITERATURE

Packaged automatic boilers for hot water heating

Four-page, illustrated bulletin tells about packaged automatic boilers in capacities from 8 to 25 hp, for pressures up to 15 psi. With either oil or gas firing burners, this equipment is recommended for heating and low pressure process applications in industrial plants, garages, hospitals, etc. Tables containing dimensions, weights, and ratings for various models in manufacturer's line are included.

Bul 1233 is issued by Orr & Sembower, Inc., Dept. CP, Morgantown Road, Reading, Pa. When inquiring specify 9645 on form opposite last page.

Essential oils and aromatic chemicals listed

Along with oils and chemicals, 12-page wholesale catalog lists citrus concentrates, floral absolutes, and concretes, animal and resinoid fixatives, tinctures, oleoresins, and balsams, gums and sundries. Information on coloring materials is included.

"October 1956 Price List" is issued by Fritzsche Brothers, Inc., Dept. CP, 76 Ninth Ave., New York 11, N.Y. When inquiring specify 9646 on form opposite last page.

Heat, bake, dry, or cure with electronic oven

Heating, baking, drying or curing non-metallic, non-conductive material with dielectric ovens is described in four-page, two-color bulletin. Photographs show standard models of ovens, and table gives dimensions and power output ratings.

Bul 56-E is issued by Young Brothers Company, Dept. CP, 1831 Columbus, Cleveland 13, Ohio. When inquiring check 9647 opposite last page.

Shows range of instruments for spectroscopic work

Twenty-page catalog illustrates and explains various types of spectrometers. Diffraction, prism, reversion, and ultra violet types and their accessories are treated. Direct-reading spectrometer with reversed spectra technique is featured.

"Beck Spectrometers" is issued by The Ealing Corp., Dept. CP, PO Box 90, Natick, Mass. Specify 9648 on form opposite last page.



Every Article in CHEMICAL PROCESSING

is
"Staff Written"

Every article in CHEMICAL PROCESSING is terse, brief, to-the-point . . . yet packed with essential facts of developments important to every man in chemical processing.

For every article is "Staff Written." Our Editors dig out the vital news-facts, then write them in the fewest possible words. That's why you read so much . . . keep up with developments . . . in short reading time. You don't have to "wade through" long, hard-to-read articles.

It's the most difficult kind of editing, but it pays big dividends to every busy reader.



**Super-pressure tubing,
engineering data**

Technical memorandum offers three pages of engineering data on super-pressure tubing (100,000 psi). Table lists maximum wall thickness for each of 10 standard sizes and gives minimum bursting pressure for single-wall tubing. Seven formulas for determining stresses set up in walls of tube by pressure of fluids within the tube are included. Hydrostatic and boroscopic tests used to assure safe service under specified pressures are outlined.

Data Memorandum 22 is available from Superior Tube Co., Dept. CP, 1512 Germantown Ave., Norristown, Pa. When inquiring specify 9649 on form opposite last page.

**Compressor troubles diagnosed
in illustrated booklet**

Four-page booklet helps to locate and correct common air-cooled and water-cooled compressor troubles. A cartoon sequence pictures a full description of compressor troubles — from failure to deliver air to excessive oil consumption.

Bul PC — 509P is issued by Merchandising Sales Department, Worthington Corporation, Dept. CP, Harrison, New Jersey. When inquiring specify 9650 on form opposite last page.

Presents variety of steel products

Fully illustrated and indexed catalog of 70 pages presents company's complete line of products. Included are special steel items, overhead conveying equipment, processing belts, wire and wire products, industrial screens and wire fabrics. Coal chemicals and coke are also listed.

Cat G-50 Rev is issued by Colorado Fuel and Iron Corp., Dept. CP, 575 Madison Ave., New York, N.Y. When inquiring specify 9651 on form opposite last page.

**Vertical-lift conveyor
applications shown**

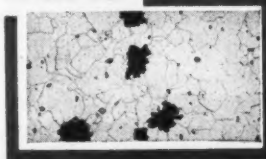
Two-page, two-color bulletin shows uses of vertical-lift conveyor. Illustrations of installations, and conveyor specifications are included.

Form 1400-56 is issued by Rapids-Standard Co., Inc., Dept. CP, Rapistan Building, Grand Rapids 2, Mich. When inquiring specify 9652 on form opposite last page.

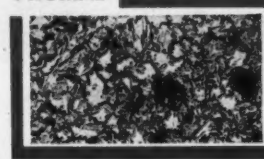
Link-Belt Promal chain specified to resist heavy loads and abrasive wear



GREATER WEAR RESISTANCE of Link-Belt H-Class Promal Drag Chain has been proved in grueling conveying service under severely abrasive conditions. Promal's extra strength provides low-cost, long-life performance where ordinary chains fail.

MALLEABLE

MICROPHOTOS show difference between ordinary malleable iron and Promal. Left—white areas in malleable microphoto represent "free iron" . . . black shows soft nodules of carbon. Right—dark areas in Promal structure show stronger, stiffer reinforcing material which strengthens metal; resists distortion, wear.

PROMAL

Specially heat-treated malleable iron provides extra wear resistance

Fewer conveyor shutdowns and minimized replacements are economies realized by users of Link-Belt Promal chain. Its greater strength absorbs continuous impact loads — and wear resistance supplies the durability to cope with severe abrasion.

Promal is more than a partially annealed or surface-hardened malleable iron. Developed by Link-Belt, this specially heat-treated malleable iron is actually transformed into a metal of radically different physical properties. Promal, because of uniform micro-structure throughout its whole section, provides greater ultimate strength, higher yield point, exceptional fatigue resistance and a remarkable capacity to withstand abrasive conditions.

For unusually abrasive or mild corrosive conditions, Promal chain can be furnished with "file-hard" surfaces. Copper bearing or special alloy content also available.



Ley bushed chain withstands grueling service conditions

Rugged, reinforced cast links with renewable, hardened steel bushings on Link-Belt Ley Bushed chains minimize abrasive wear. Shields on integral sidebars deflect dirt and abrasives from joints. Steel connecting pins are also shielded — and locked against rotation. Heels on inside of links provide wear-resistant sliding surfaces and guide the chain onto the sprocket.

**HEADQUARTERS
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SPROCKETS**
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page Catalog 950.

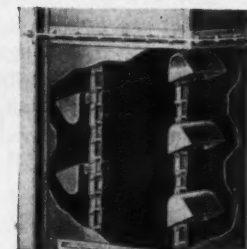
LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. South Export Office, New York 7; Canada, Scarborough (Toronto 13); Australia, Marrickville, N.S.W.; Africa, Springs. Representatives Throughout the World.

How and where to apply Promal Chains in the Chemical Industries

Choose Link-Belt Promal chains for highly abrasive conditions—for extra strength and wear resistance demanded by heavy loads or long, sliding conveyors. They last much

longer . . . cost but a little more.

The wide range of Link-Belt chains available in Promal includes all types of cast and combination chains.



Class C combination chain is one of the most popular types for general purpose elevator and conveyor service. The cast center links and steel sidebar combination forms a strong, rugged yet inexpensive elevating medium. Attachments are available for both cast center links and the steel sidebars so that desired bucket spacing may be accommodated.

LINK-BELT
CHAINS AND SPROCKETS

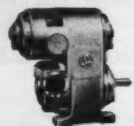
When inquiring check 9653 opposite last page

Win the Race

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VARIABLE SPEED MOTORS



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Electric Power Drive Systems are important factors in determining the productivity and flexibility of any manufacturing process. To help you successfully compete with the trend toward mechanization and automation, Sterling offers a wide range of power transmission equipment—variable speed or constant speed—with manual or automatic controls. These products, plus Sterling's Application Engineering Service, give your machinery the type of drive system that assures versatility and maximum productivity at lowest cost.

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When inquiring check 9654 opposite last page

NEW LITERATURE

Highly heat-resistant, rigid polyethylene

Super Dylan polyethylene is more rigid than conventional polyethylenes and can be subjected to temp of 250°F without visible change in appearance. Described in 20-page brochure are its use in molding, extrusion, and calendaring, along with fabrication techniques and properties.

Bul C-6-216 is issued by Chemical Div., Koppers Co., Inc., Dept. CP, Pittsburgh 19, Pa. Specify 9655 on form opposite last page.

Packaging problems — how solved

Approaches to packaging problems by various companies are discussed in 42-page booklet. Problems, solutions, and results concerning packaging of small and large products are covered. Organization and function of packaging divisions are described in detail, and charts showing organizational breakdown are included.

To obtain Packaging Series 49, "Company Approaches to Better Packaging", remit \$1.00 (members) or \$1.75 (non-members) to American Management Association, Dept. CP, 1515 Broadway, Times Square, New York 36, N. Y.

Petroleum Industry odor control

Recommendations for use of manufacturer's odor control agents to control malodors from refining, sweetening, and other petroleum operations are presented in a four-page, pocket-size folder.

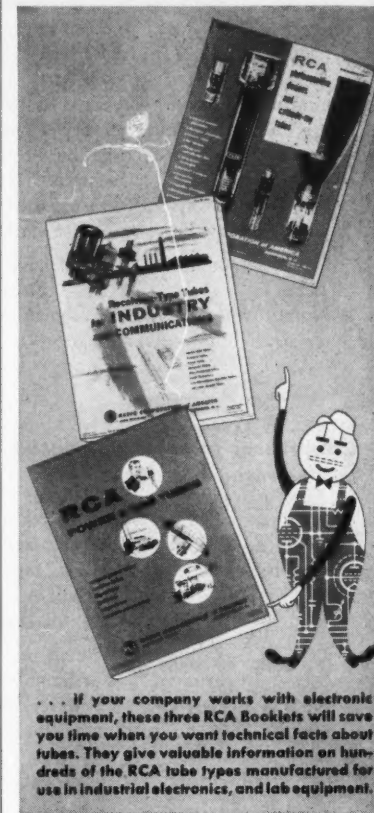
"Odor Control for Petroleum by Alamask" is issued by Rhodia, Inc., Dept. CP, 60 E. 56th St., New York 22, N.Y. When inquiring check 9656 on form opposite last page.

Outlines temperature control using infrared radiation

Catalog of 16 pages outlines equipment required for temperature control using infrared radiation. In two colors, bulletin also describes design and test equipment for measuring gain and phase shifts in lower frequency ranges.

Catalog SF 9901 is issued by Servo Corporation of America, Dept. CP, 20-20 Jericho Turnpike, New Hyde Park, N. Y. When inquiring specify 9657 on form opposite last page.

Fast...Handy Fact Books...on RCA ELECTRON TUBES!



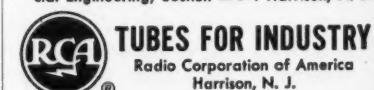
... if your company works with electronic equipment, these three RCA Booklets will save you time when you want technical facts about tubes. They give valuable information on hundreds of the RCA tube types manufactured for use in industrial electronics, and lab equipment.

RCA Power and Gas Tubes (PG-101B)—contains descriptions, terminal connections, technical information on RCA vacuum power tubes, rectifier tubes, thyatrons, ignitrons, magnetrons, and vacuum-gauge tubes. The most up-to-date booklet of its kind in the industry.

Receiving-Type Tubes for INDUSTRY and Communications (RIT-104)—includes technical data, socket-connection diagrams, and descriptions on RCA Special Reds, premium, computer, pencil, glow-discharge, small thyatrons, low-microphonic, and other tube types especially suited to industrial electronics.

RCA Photosensitive Devices and Cathode-ray Tubes (CRPD-105)—gives descriptions and technical details on RCA single-unit, twin-unit, and multiplier phototubes; TV camera tubes; special kineoscopes; oscillograph tubes, and other types for industrial electronics and laboratory equipment.

SEND FOR THESE BOOKLETS TODAY! Write on your company letterhead to RCA, Commercial Engineering, Section L75T, Harrison, N. J.



RCA ELECTRON TUBES . . . LONG-LASTING, DEPENDABLE . . . AVAILABLE THROUGH YOUR AUTHORIZED RCA TUBE DISTRIBUTOR.

When inquiring check 9658 opposite last page

CHEMICAL PROCESSING

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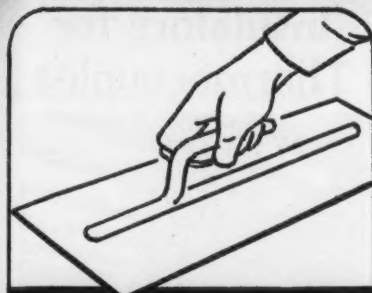
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Trowel on CORROSION RESISTANT FLOORS

with your own plant labor

New Chemi-Top floor surfacing compound gives you a dense, non-porous, rock-hard floor that withstands impact, wear and corrosive action. Chemi-Top Floors outwear other acid-proof floors, cost much less.

Chemi-Top Floors are chemically inert, won't react to acids, salts, oils, alkalis or grease. Spilled industrial chemicals, brine, inks, greases or dyes can be wiped up without even a stain. Chemi-Top is excellent, too, for surfacing drains, tank linings or walls.

Four times tougher than concrete, Chemi-Top has a compressive strength of 40,000 to 50,000 lbs. PSI as against 10,000 to 14,000 for the best concrete.

Plant labor can apply. Prepare floor according to directions, then trowel on a layer 1/2" thick. You'll get a smooth, burnished floor that is slip resistant and easy to keep sanitary. Added floor height around drains, sills and equipment is negligible.



For full details
Write Dept. CP-12
for folder

**THE GARLAND
COMPANY**
Cleveland 5, Ohio

When inquiring check 9659
opposite last page

DECEMBER 1956

NEW LITERATURE

Guide for planning installation of high vacuum system

Information on planning high-vacuum systems for laboratories is presented in 24-page bulletin. Pumping speed, connections and speed of evacuation, merit factor and speed of pump, selection of high-vacuum pumping systems, and low pressure technique are covered.

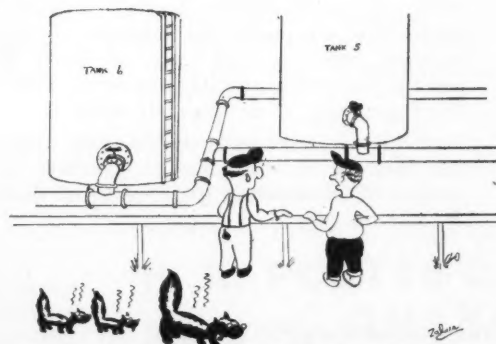
High-vacuum pump selection chart gives variety of manufacturer's pumps, their capacities, speed, dimensions, and other data for vacuum installations. Charts showing capacity-pressure curves and speed-pressure curves, and photographs of mechanical vacuum pumps are included.

Bul 9 is issued by Central Scientific Company, Dept. CP, 1700 Irving Park Road, Chicago, Ill. When inquiring specify 9660 on form opposite last page.

Problem of painting, coating failures

Problem of painting and coating failures and what can be done to salvage certain situations are discussed in four-page bulletin. Typical cases are cited pointing out an actual problem and then information given to show how the situation was aided. Suggestions are given to show how costly mistakes can be avoided.

"Painting" is issued by Foster D. Snell, Inc., Dept. CP, 29 W. 15th St., New York 11, N.Y. When inquiring specify 9661 on form opposite last page.

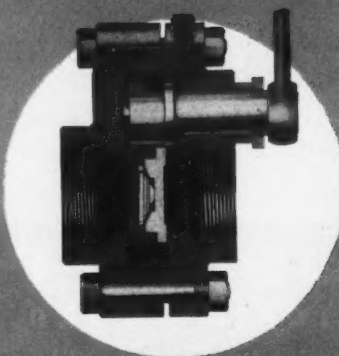


"Do you detect a leak, Jones?"

Thanks to Robert Zahour, General Aniline & Film Corp., Dyestuff and Chemical Division Linden, New Jersey.

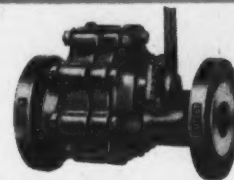
Everlasting Valves

are superior
for many
services



BOILER BLOW-OFF

Quick acting, also handwheel operated "Y" and angle types. For pressures up to 600 psi.



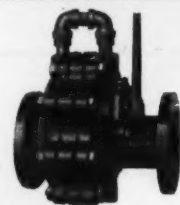
GENERAL SERVICE

Where drop-tight seal and full flow is essential.



CYLINDER OPERATED

Can be remotely controlled, electrically or manually.



STEAM JACKETED

Assures free flow of viscous materials.



WEIGHT-OPERATED

For automatic drains or emergency shut off.

When you want

- quick action
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then you want an Everlasting Valve

No other valve has all the Everlasting features... proven by half a century of service to assure dependable, leak-tight service.

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Industry...

Wire Mesh

Specializing in the
non-ferrous metals in counts to
200 x 200 or 50 x 750 and
widths up to 48" in all
commercial weaves

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When inquiring check 9663 opposite last page

alphabetical
index
on
page 205



... for alphabetical index of all processes, materials, services, and equipment discussed in this issue's editorial columns and advertisements, turn to page 205. "Quick-locator" starting on that page was a feature in **CHEMICAL PROCESSING** years ago. It means extra work for the Editors, but it helps you, the reader in finding what you want ... in a hurry!

NEW LITERATURE

Formulas for solvent-thinned and water-thinned paints

Twenty-four formulas for solvent-thinned paints and 17 formulas for water-thinned paints are featured in 46-page booklet. Each formula sheet is three-hole punched so it can be removed and placed in a binder. Celite diatomaceous silica is defined, and the extra dividends it offers are pointed out.

"Pigment Extenders, Flattening Agents, Filter Aids for the Finishes Industry" is issued by Johns-Manville, Dept. CP, 22 East 40th St., New York 16, N.Y. When inquiring specify 9664 on form opposite last page.

Mechanical packing for industry

Catalog of 24 pages contains 246 types of mechanical packings for every service in industry. Descriptions, specs, and applications are given for each packing type. Products discussed include Inconel-wire reinforced plastic, twisted foil packings for oil and distillate temperatures to 1000°F., and other asbestos and metallic materials. Recommendations chart suggests proper material for various services.

Cat 56 is issued by The Belmont Packing & Rubber Co., Dept. CP, Butler and Sepviva Sts., Philadelphia 37, Pa. When inquiring specify 9665 on form opposite last page.

Features pneumatic-tire fork-lift trucks

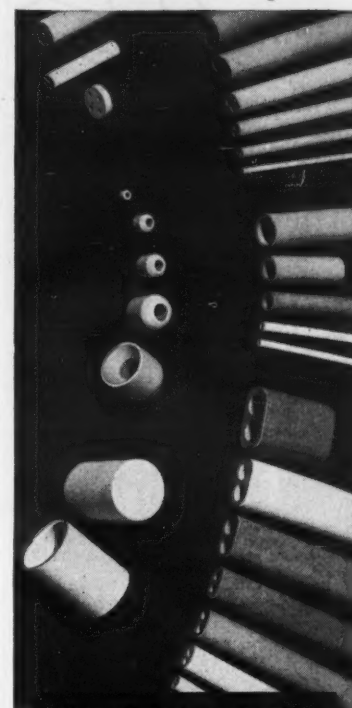
Fork-lift truck models ranging in capacity from 1000 to 30,000 lb are illustrated in 12-page, two-color booklet. Pneumatic-tire trucks of 3000-, 4000-, and 5000-lb capacities are featured. Photographs show attachments for handling different types of materials. Yard crane of 10,000-lb capacity is described, and sales and service directory for all types of equipment is included.

Form 1487 is issued by Hyster Company, Dept. CP, 2902 N. E. Clackamas St., Portland 8, Oregon. When inquiring specify 9666 on form opposite last page.

The aerosol story

History, technique, formulas, and tests are covered in this detailed 48-page brochure on aerosols available on letterhead request to Dodge & Olcott, Inc., Dept. CP, 180 Varick St., New York 14, N.Y.

Insulators for Thermocouples



thermal shock resistant?
mechanical strength?
high temperature resistant?

It's **SERV-RITE** for any need

One or more of these SERV-RITE thermocouple insulators will take care of your needs. If not, there are many more in Gordon's large stock for quick delivery. If you need something entirely special, it can be made to suit your specific requirements.

In the 50 years that Gordon has been supplying thermocouples and accessories to industry, emphasis has been on uniform top quality, service, and value. And so with insulators for any thermocouple application, SERV-RITE assures you of plus values every time.

Write for full information on SERV-RITE thermocouple insulators.

Ask for Bulletin 300-56

This new 4-page bulletin gives specifications and ordering data on all Gordon standard SERV-RITE thermocouple insulators grouped for easy selection.

6404

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Manufacturers • Engineers • Distributors

603 West 30th St., Chicago 16, Ill.
2031 Hamilton Ave., Cleveland 14, Ohio

When inquiring check 9667
opposite last page

CHEMICAL PROCESSING

Nitrogen fertilizer solutions

Up-to-date data on nitrogen solutions for the fertilizer and chemical industries are available in 48-page handbook. Complete with illustrations and tables, this spiral-bound handbook describes chemical, physical properties, storage information, and information on granulation and formulation of fertilizers. Many formulas and conversion factors are included.

"Nitrogen Fertilizer Solutions" is issued by Nitrogen Division, Allied Chemical & Dye Corporation, Dept. CP, 40 Rector Street, New York 6, N.Y. Specify 9668 on form opposite last page.

Details permanent magnets

Photographs, dimension drawings, and charts are used to illustrate 16-page catalog of permanent magnets. Introductory pages give a basic analysis of permanent magnetic properties and importance of engineered applications. Industrial units shown include plates, sweepers, separators, drums and pulleys, grids, troughs and filters.

Cat 156 is issued by Dept. 52, Magni-Power Co., Dept. CP, Wooster, Ohio. When inquiring specify 9669 on form opposite last page.

Conductive coatings for acrylic plastics

Three bulletins describe electrically conductive coatings for acrylic plastics. These are "Development of Electronically Conductive Transparent Coatings for Acrylic Plastic" at \$2.50, and "Development of Electrical Conducting Transparent Coatings for Acrylic Plastic Sheet" at \$1.25 for part one and \$1.75 for part two. Bulletins have 92, 47, and 61 pages respectively. They may be obtained by sending remittance directly to the Office of Technical Services, US Dept. of Commerce, Washington 25, D.C.

Features analytical balance with knob fraction loader

Data sheet describes analytical balance accurate to 1/100,000 of capacity. Balance has knob-controlled fraction loader for adding or removing fractions of a gram.

"Reyers-Progress" data sheet is issued by Arthur S. La Pine & Company, Dept. CP, 6001 S. Knox Ave., Chicago 29, Illinois. When inquiring specify 9670 on form opposite last page.



Here's why this PETROCHEM fire hose is on guard throughout this D-X Sunray refinery

Get acquainted with your Quaker-Quaker Pioneer distributor. You'll find him of real help—not only for your regular needs—but also in emergency situations requiring extra fast supply. Write for free brochure and name of your nearest distributor.

This hose does *more* than fight fire. It fights off deterioration by oil and chemicals, stands up to abrasion, resists weather and functions safely under high pressure. Why? Because its oil-resistant Neoprene tube is enclosed in tough, wear-defying Du Pont Dacron impregnated with oil-proof Neoprene . . . this provides a tough, light, flexible hose, resistant to oil, both inside and out. Actually this hose is so strong that it can take pressures up to 500 lbs. and temperatures up to 300°F. . . and so flexible that you can actually knot it. Easy to store, too! Either coiled or folded it takes little space.

These are some of the reasons why D-X Sunray's Oklahoma refinery has this hose . . . the first made for oil and chemical industries, at all fire stations . . . and why it will pay you to consider it in your safety planning. Complete Quaker-Quaker Pioneer line includes hose for every purpose, belting, packing and moulded rubber for every use.

H. K. PORTER COMPANY, INC.

HKP

QUAKER RUBBER DIVISION

Philadelphia 24, Pa.

QUAKER PIONEER RUBBER DIVISION

Pittsburg, Calif

When inquiring check 9671 opposite last page

THIS IS THE STORY of three men and a VALVE. Joe, a chemical engineer, needed valves that could handle tough corrosives. Bill, a refining engineer was looking for valves that gave a positive shut-off. Tom, working for a large industrial firm, needed valves that sealed both upstream and downstream. All three solved their problems by specifying Hamer Visible Wedge Valves. These remarkable valves combine the double sealing action of precision metal-to-metal fit augmented by dependable seal rings. The wedges are trimmed with nickel, while seats are trimmed with stainless steel to withstand the roughest corrosive conditions. The full-view wedges are handwheel operated --can't blow out or drop on a toe. The wedges pivot so no lifting is necessary. So if your plans require long service, sure-seal shut-off valves, by all means specify HAMER VISIBLE WEDGE VALVES.

P.S. For descriptive literature, write:



Hamer

VALVES, INC.

2919 Gardenia Ave., Long Beach 6, California
Representatives Throughout the World.

When inquiring check 9672 opposite last page

NEW LITERATURE

As a secondary plasticizer for vinyls, chlorinated paraffin gives advantages

A liquid chlorinated paraffin, containing about 40% chlorine, is recommended as secondary plasticizer for vinyl resins. This five-page bulletin lists as advantages: low cost, low volatility, low migration rate, lack of odor and toxicity, light color, and low viscosity. Properties, typical formulations, and tests are presented.

"Clorowax LV" is issued by Chlorinated Products Div., Diamond Alkali Co., Dept. CP, 300 Union Commerce Bldg., Cleveland 14, Ohio. When inquiring check 9673 on form opp. last page.

Details rotational viscometers and accessories

In two colors, eight-page catalog describes multi-speed rotational viscometers plus available accessories. Information is included on general subject of viscosity. Applications are suggested.

"Synchro-Lectric Viscometer" is issued by Brookfield Engineering Laboratories, Inc., Dept. CP, 240 Cushing St., Stoughton, Mass. When inquiring specify 9674 on form which is located opposite last page.



"I don't suppose it occurred to you to bolt it down before you filled it..."

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THE
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TREAT-
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WATER TREATMENT, THAT IS
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TO
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When inquiring check 9675
opposite last page

CHEMICAL PROCESSING

Formulations of styrene resin in MRG, other elastomers

Twelve-page manual gives latest information on Hystron high-styrene resin (85% styrene/15% butadiene). Compounding information and suggested formulations for this easy-processing resin are given for shoe soles, floor tiles, light and black mechanical goods, ball covers, and neoprene wire jacket.

Bul HY-2 is issued by Chemical Div., The General Tire & Rubber Co., Dept. CP, 1708 Englewood, Akron 16, Ohio. When inquiring check 9676 on form opposite last page.

Silicone-based water-repellent treatment described

Benefits and advantages of silicone-based water-repellent treatment for masonry are explained and illustrated in four-page brochure. Examples of laboratory developmental work are featured, along with case-history reviews of field use.

Bul 8-301 is issued by Dow Corning Corp., Dept. CP, Midland, Mich. When inquiring specify 9677 on form opposite last page.

Specs for tractor-shovels detailed

Four-page specification sheets present information on 1-1/3 cu yd and 1 3/4 cu yd tractor-shovels. Operating features, construction details, performance capabilities, and over-all specifications for each model are covered.

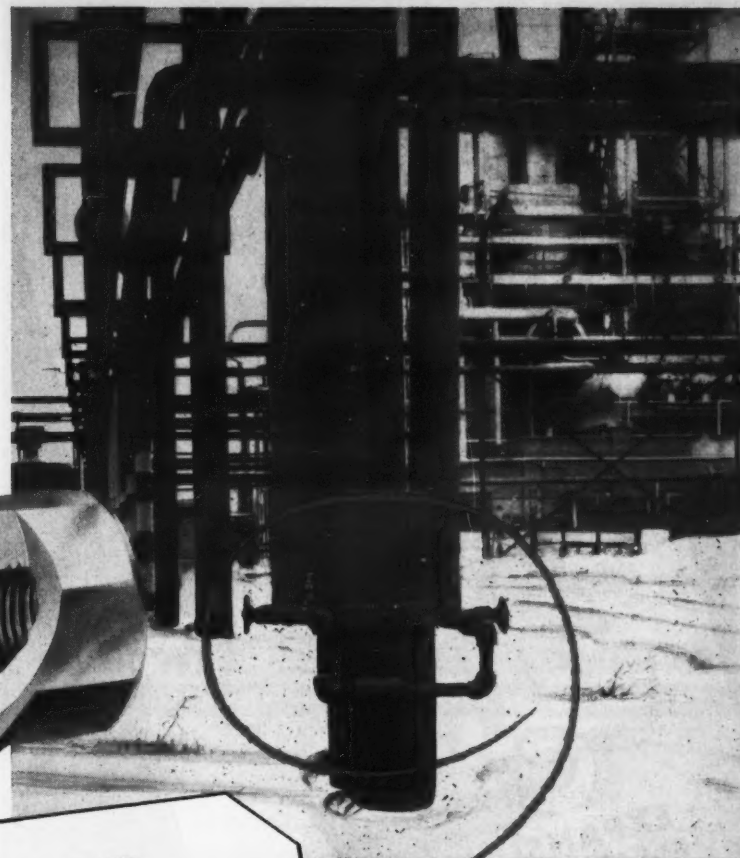
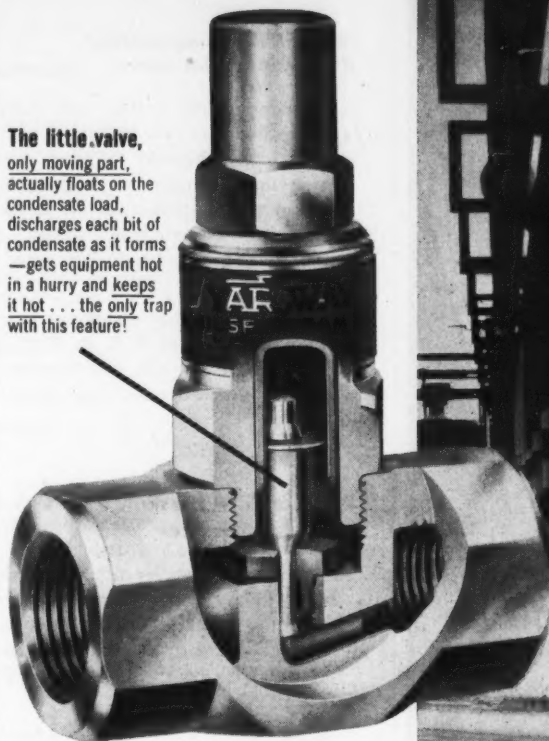
Form 307, "Model HH, 1-1/3 cu yd Tractor-Shovel," and Form 311, "Model HH, 1 3/4 cu yd Tractor-Shovel," are issued by The Frank G. Hough Co., Dept. CP, Libertyville, Ill. When inquiring specify 9678 on form opposite last page.

Hydrazine solution controls corrosion and scale

Removal of dissolved oxygen from boiler feed-water by using 35 percent hydrazine solution is detailed in 16-page booklet. Use for protecting low-, medium-, and high-pressure boilers is discussed. Comprehensive operating data are presented in the form of case studies in each of the three boiler classes.

"Scav-Ox," is issued by Olin Mathieson Chemical Corp., Dept. CP, 460 Park Ave., New York 22, N.Y. When inquiring specify 9679 on form opposite last page.

The little valve,
only moving part,
actually floats on the
condensate load,
discharges each bit of
condensate as it forms
—gets equipment hot
in a hurry and keeps
it hot... the only trap
with this feature!



**PREPARED
FOR WINTER!**

Is your plant ready for cold weather?

Steam lines and process equipment equipped with Yarway Impulse Steam Traps are prepared for winter:

- ... protected against freeze-ups.
- ... capable of operating at high even temperatures.
- ... ready for peak production loads.

The little valve of the Yarway Impulse Steam Trap (only moving part) continually tests for condensate, discharges each bit as it forms, prevents freezing.

Combined with other important Yarway features—fast equipment heat-up, stainless steel construction, small size, light weight, good for all pressures without adjustment, low initial cost—this adds up to the best winter trapping you can buy.

Check your traps now. Then call the Yarway distributor for the Impulse Traps you need. 270 of these distributors, one near you. We'll gladly send you his name also the latest Yarway Steam Trap Bulletin. Write to...

YARNALL-WARING COMPANY
125 Mermaid Avenue, Philadelphia 18, Penna.

YARWAY

impulse® steam trap

The Impulse that revolutionized steam trapping 20 years ago.

When inquiring check 9680 opposite last page

good insurance policy for Your Chemical Piping



Chemiseal®
EXPANSION JOINTS
FLEXIBLE COUPLINGS
• made of duPont TEFLON

... now the "policy" of many Processing Plants



Protect costly piping, usually low in impact strength, against shock, vibration, expansion and contraction. Save their cost in pipe maintenance.

Chemically impervious, non-contaminating (TEFLON).

Eliminate slip-joints, gaskets, adaptors. Made to mate with any companion flanges.

Standard Sizes from 1/2" to 10" I.P.S. Ask your U. S. Gasket—Belmont Packing Distributor or write for Catalog EJ-1155.

UNITED STATES GASKET CO.
Camden 1, New Jersey

U.S. GASKET • BELMONT PACKING

When inquiring check 9681 opposite last page

NEW LITERATURE

'Slide Rule' comparator determines film costs

Functioning like a slide rule, comparator quickly determines costs per square foot of "Mylar" polyester film compared to other materials. Reverse side matches main physical, chemical, thermal, and electrical properties of polyester films with those of polyethylene, acetate, acetatebutyrate, polystyrene, rag paper, varnished cambric, and PVC.

"Slide Rule" comparator is issued by DuPont Film Department, E. I. du Pont de Nemours & Co., Inc., Dept. CP, Wilmington 98, Delaware. Specify 9682 opposite last page.

Product data presented on control devices

Application features of control devices built to meet Joint Industry Conference standards are discussed in 12-page bulletin. Data on oil-tight push button, solenoid, limit switch, magnetic starter, plugging switch, and pneumatic time-delay relay are listed.

Bul GEA-6317 is issued by General Electric Company, Dept. CP, Schenectady 5, N. Y. When inquiring specify 9683 on form opp. last page.

Answers general questions on fluorimetric analysis

A high-sensitivity photoelectric fluorescence meter recently developed by manufacturer is covered in 19-page descriptive bulletin. Application of the instrument in various fields is treated, and numerous questions pertaining to fluorimetric analysis are discussed and answers provided.

Bul 392 is issued by Photovolt Corp., Dept. CP, 95 Madison Ave., New York 16, N. Y. When inquiring specify 9684 on form which is located opposite last page.

Describes use of slurry mixers for blending and storage

Eight-page, two-color bulletin describes design, sizes, physical characteristics, capacities, and special features of slurry mixer for cement and other industries. Line drawings of each type of available equipment and photographs of installations are included.

Bul 1141-R is issued by Dorr-Oliver Incorporated, Dept. CP, Barry Place, Stamford, Conn. When inquiring specify 9685 opposite last page.

Improve Quality!
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... BUT HOW?



Why
Not

Examine Your Product
for Traces of **IRON**
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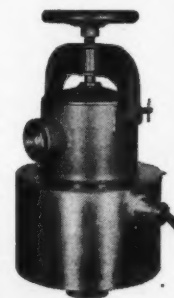
Magnetic Separators

If even microscopic ferrous particles show up, they may give an otherwise good product a bad name. Frantz FERROFILTERS can end this problem simply and economically to your satisfaction — and to your customers'.

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Here is a low cost opportunity to prove the efficiency of FERROFILTER Magnetic Separators in your processing operations. Write for details of our liberal rental plan.

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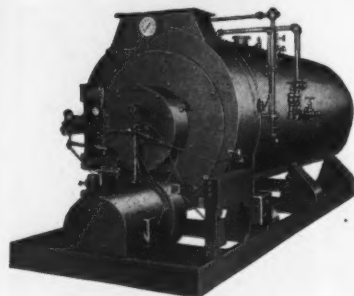
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When inquiring check 9686
opposite last page

CHEMICAL PROCESSING

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2929 E. First St., Oswego, N. Y.
Please send me a free copy of your booklet giving full information on Cyclotherm Steam and Hot Water Generators.

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DECEMBER 1956

NEW LITERATURE

Wanted: Nomographs!

Each could earn \$20!

Do you have a pet nomograph that could save time for other CHEMICAL PROCESSING readers? Send it to:

DATA EDITOR
CHEMICAL PROCESSING
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Chicago 11, Illinois

CHEMICAL PROCESSING pays \$20 for each one accepted and published.

Aliphatic nitrogen compounds

Aliphatic nitrogen compounds, derivatives of ammonia in which hydrogen atoms are replaced by organic radicals, are described in detail in this 48-page booklet. Tables and graphs are used to present physical properties, shipping and other data. Constant-boiling mixtures, specifications, and test methods are given. An extensive bibliography is included with the text. There are 24 charts and five tables in the booklet.

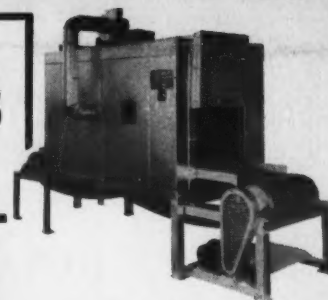
Bul F-4770D is issued by Carbide and Carbon Chemicals Co., a div. of Union Carbide and Carbon Corporation, Dept. CP, 30 E. 42nd Street, New York 17, N.Y. When inquiring check 9688 on form opposite last page.



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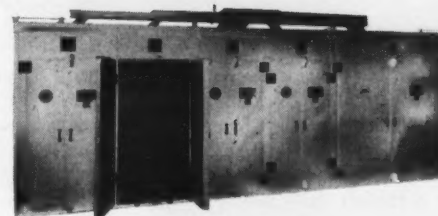
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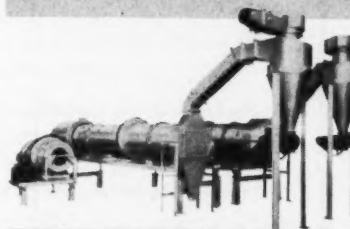
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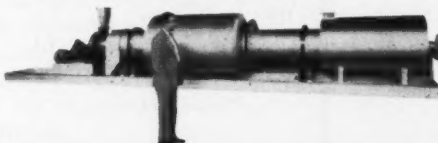
When inquiring check 9690 opposite last page

When specifying Chemical Processing Equipment Don't Buy "Guesswork" Designs!

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Three basic pilot units (Continuous Combination Ammoniator-Granulator, Dryer, and Cooler... complete with air-handling systems) for producing chemicals and chemical fertilizers. Designed and fabricated for a leading chemical company to be used in its Research and Development Center.



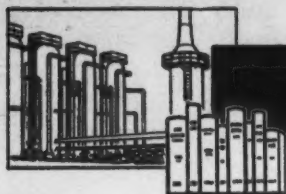
DehydrO-Mat (Patented) Pilot Plant Dryer, 21' long, is highly flexible in its operational capacities. One of these was recently sold to a South African Government to be used to institute a conservation program on agricultural waste.

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processing and engineering data

177

PERMEABILITY of POLYETHYLENE

To Selected Common Solvents

Data by JULES PINSKY and A. R. NIELSEN, Plax Corp.¹

Nomograph by BILL SCHREMP, Assistant Editor

Recent work on the permeability of polyethylene to various solvents has produced data of interest to those concerned with use of polyethylene for packaging and as a vapor barrier. The nomograph presented here serves as a guide to the extent to which these materials will pass through such a film.

It should be noted that these data are the result of tests run at temperatures from 32 to 165°F and in no case were tests made above the boiling point of the material under study. Higher and lower temperature values are extrapolations of the data. Furthermore, the permeability given here is a combined figure for liquid and vapor phases of the solvent — as a rule the liquid will permeate polyethylene faster than the vapor.

It should also be noted that permeability is not a linear function of the thickness of film. Heavier gages of polyethylene tend to be more crystalline

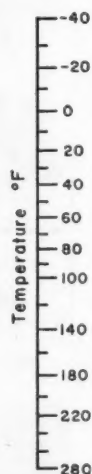
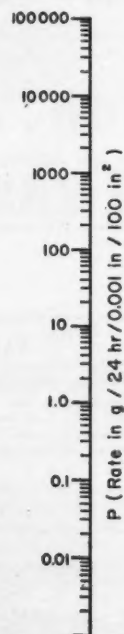
(with lower permeability) than lighter gages. There are data² showing that in gages of about 100 mils, however, permeability apparently again increases. Data presented here were gathered in tests using 40-mil film.

Typical Example

Use of nomograph is illustrated as follows: What is the permeation rate of acetone at a temperature of 60°F? A straight line drawn from 60 on the temperature scale through point seven for acetone intersects the permeability scale at the desired value, 5.0.

LITERATURE CITED

- (1) H. A. BENT and J. PINSKY, "Theoretical Investigation of the Mechanism of Transfer of Materials Through Polyethylene."
- (2) J. PINSKY, A. R. NIELSEN, and J. H. PARLIMAN, *Modern Packaging*, Vol 27, Oct. 1954.



- | | |
|-----------------|------------------------|
| 1-Benzene | 7-Acetone |
| 2-Water | 8-Ethyl Acetate |
| 3-p-Xylene | 9-tert-Butanol |
| 4-n-Heptane | 10-Amyl Acetate |
| 5-Chlorobenzene | 11-Methyl Ethyl Ketone |
| 6-o-Xylene | 12-n-Propanol |
| | 13-Nitroethane |

CHEMICAL PROCESSING — December, 1956



Knock out scale with Wilson Tube Cleaners

Are your tubes completely fouled with scale buildup? Or, are you looking for that last vital inch of heat transfer efficiency? In either case, efficient hard-working Wilson Tube Cleaners are the answer.

Wilson brings you a complete line of fast-acting tube cleaners. They handle every kind of deposit, hard or soft, thick or thin or variable in depth. Driven by air, steam, water or electricity, these powerful cleaners make quick work of cleaning straight or curved tubes.

For heavy duty service, for example, use Wilson Model TP 301 shown above. This tube cleaner is suitable for vertical or horizontal use in straight or curved tubes 3/8" ID to 2 7/8" ID and up to 40' long. Cleans rapidly, thoroughly, operating at high speed at 90 psi. Can run on pressure as low as 50 psi.

Write for your free copy of new Wilson Catalog 77. It's a mine of information on tube cleaning problems.

Representatives in principal cities

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WILSON

TUBE CLEANERS • TUBE EXPANDERS

When inquiring check 9692 opposite last page

CHEMICAL PROCESSING

NEW LITERATURE

Catalogs chemicals, essential oils

Product listings, definitions, descriptions, and price information on oils, aromatics, and colors are presented in 36-page pocket-size catalog.

May 1956 catalog is issued by Dodge & Olcott, Inc., Dept. CP, 180 Varick St., New York 14, N.Y. When inquiring specify 9693 on form which is located opposite last page.

Deaeration discussed in capsule form

The fundamentals of deaeration and why it is necessary in water conditioning are explained, in capsule form, in four-page, two-color folder. Principles of operation, as well as advantages and application of various methods, are discussed.

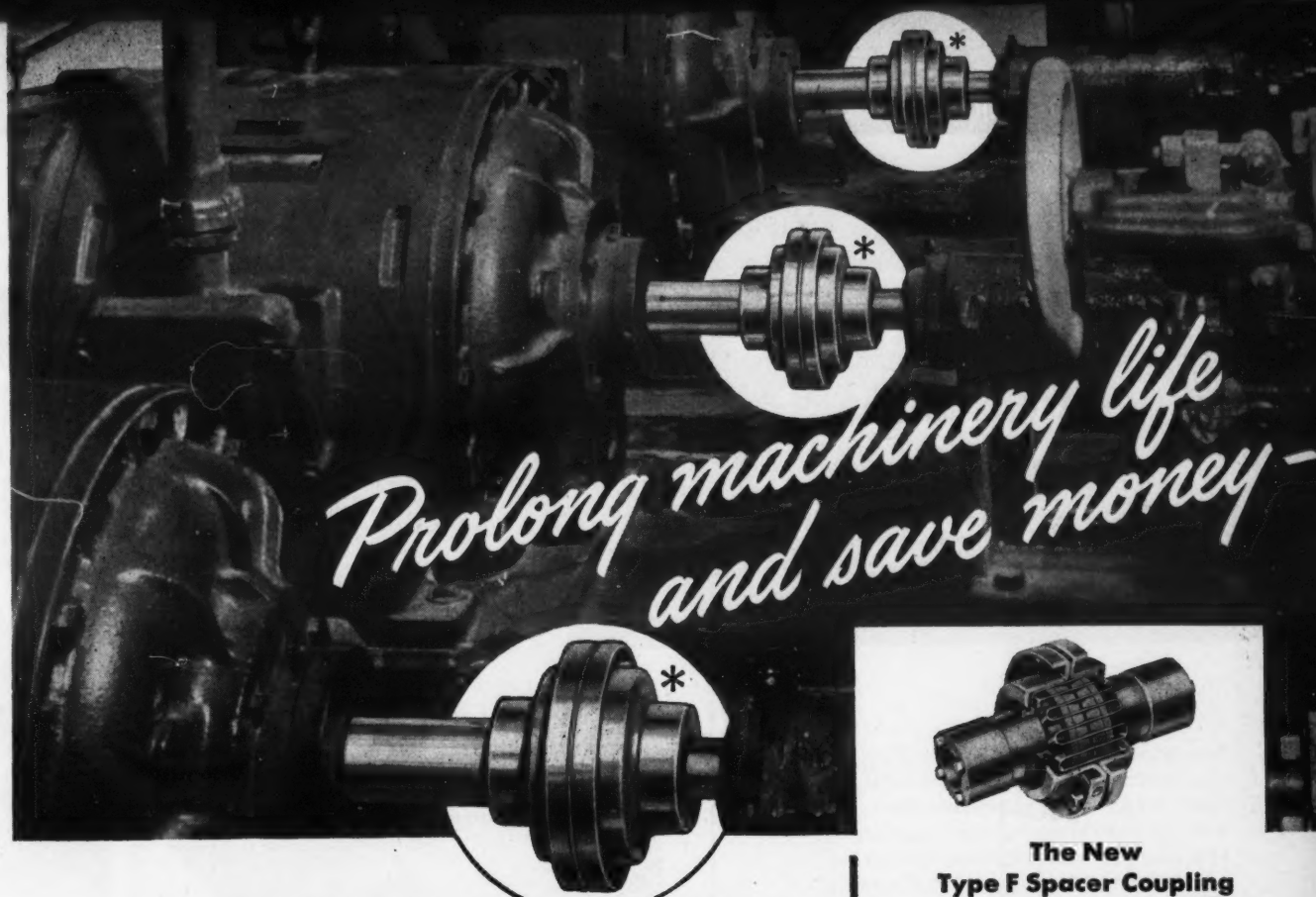
Publication 4650 is issued by Cochrane Corp., Dept. CP, 17th St. below Allegheny, Philadelphia 32, Pa. When inquiring specify 9694 opp. last page.

Reviews fundamentals of burner control

Booklet of 14 pages, first of a series on combustion control, reviews control fundamentals and their application to combustion. Basic concepts involved in "automation in combustion" are considered. Key components of combustion control systems are described.

Bul "Control Fundamentals" is issued by Cleveland Fuel Equipment Co., Dept. CP, 1111 Brookpark Road, Cleveland 9, Ohio. When inquiring specify 9695 on form which is located opposite last page.

For more information on product at right, specify 9696 ... see information request blank opposite last page.



with FALK Steelflex Couplings

Ever since the first Falk Steelflex Coupling was designed and built, we have firmly held to these beliefs:

1. A coupling, to give fullest value, must do more than merely connect driving and driven machinery—it must protect the machinery and prolong its life.
2. A coupling, to be truly flexible, must overcome the effects of shock and vibration, as well as shaft misalignment.

Proof of the soundness of those beliefs is furnished by the record. More than one million Falk Steelflex Couplings have been used on every conceivable type of industrial application... giving trouble-free service, providing maximum protection to connected machinery.

* A single basic type—the famous Type F—fills 90% of all industrial application needs. It is versatile, efficient and economical. And—it is always available from factory, field or distributor stocks, in a wide range of sizes.

Write to Department 247 for engineering bulletin, including selection and dimension tables.

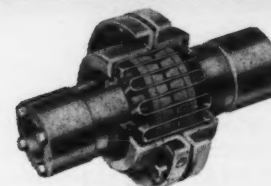
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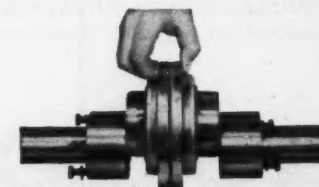


The New Type F Spacer Coupling

Here is a Steelflex coupling specially designed to permit fast, easy installation and removal in horizontal and vertical applications where it is impracticable to move the connected units—or where a space-gap (up to 12 in.) is necessary.

Like all Steelflex couplings, the Type F Spacer gives long, trouble-free service and maximum 3-way protection for connected machinery: it provides torsional resilience to reduce shock and vibration; it accommodates parallel or angular shaft misalignment; it allows free (or limited) end float.

An outstanding feature of the Steelflex Spacer is that it can be installed or removed in one piece (see photo below); no dismantling or servicing of the coupling is required. Pump assemblies can be disconnected and removed without disassembling the coupling, without exposing working parts.



The Steelflex Spacer coupling is prelubricated at the Factory and can be installed, or removed and reinstalled, without disturbing the lubricant—a highly desirable feature.



Viscosity of Steam

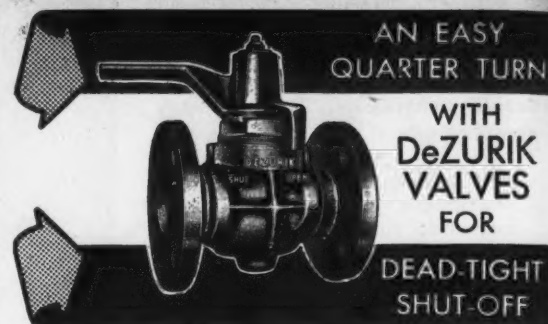
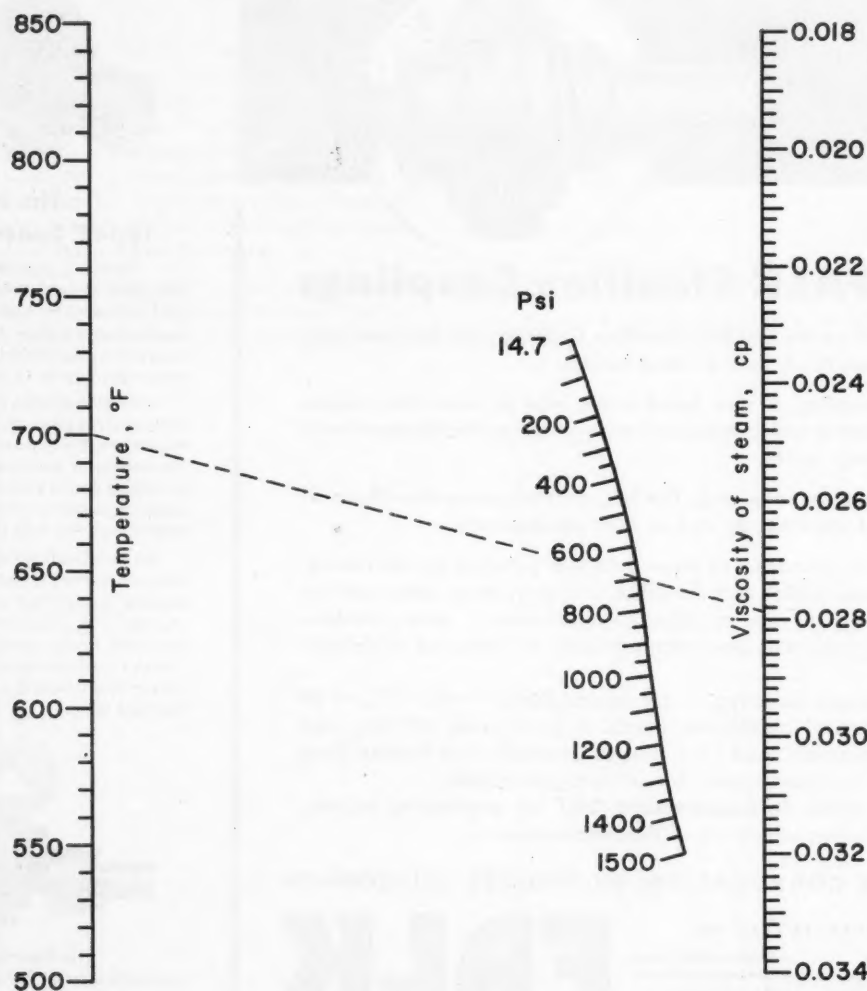
D. S. DAVIS
Professor of Engineering
University of Alabama

Recent data² show that the viscosity of superheated steam is linear with temperature at pressures between atmospheric and 1500 lb psi. The accompanying line coordinate chart, constructed by means of standard methods¹, extends considerably the utility of the original isobars. The broken index line shows that the viscosity of

steam at 700 lb psi and at 700°F is 0.0279 centipoise.

REFERENCES

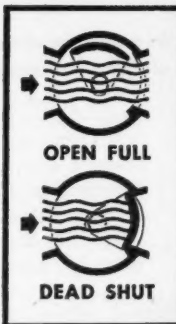
- (1) DAVIS, D. S., "Nomography and Empirical Equations," Chap. 10, New York, Reinhold Publishing Corporation, 1955.
- (2) KOLLEN, H., Power, 100 (3) 154 (1956).



DeZURIK VALVES open wide or close dead-tight with an easy quarter-turn of the lever. Their rubber-faced plugs seal tight despite grit or other solid particles in the flow. On line after line, they minimize maintenance, reduce down-time, completely eliminate many troublesome valve problems.



DeZURIK's Exclusive Eccentric Action combines e-a-s-y operation with leak-free closure. The eccentric-shaped plug meets the eccentric-raised seat *only* at the moment the valve is closed. At all other times the plug turns freely . . . without sticking, without binding, **WITHOUT LUBRICATION!**



DeZURIK Valves are manufactured in sizes from 1/2" thru 20" in a full range of materials. They can be supplied with lever, gear, pneumatic, hydraulic or electric operators. Write Dept. P-12 for complete details. Representatives in all principal cities.

DeZURIK

SHOWER CO.
Sartell, Minn.

When inquiring check 9697 opposite last page
CHEMICAL PROCESSING

**Liquid and gaseous fluorine:
properties and handling**

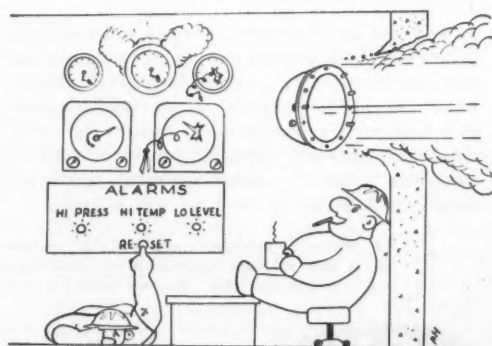
Much interest has been generated in manufacturer's recent announcement that fluorine is available as a liquid in bulk containers. Comprehensive 22-page brochure presents physical and chemical properties of this element. Materials and equipment for handling and safety precautions are covered in great detail. A large portion of these data is original and should be of great value to research and development organizations studying utilization of F in industrial processes. Five tables cover density of the liquid and its surface tension, thermodynamic functions of the molecule and atom, and density of the liquid in relation to temperature. Ten references are cited.

Fluorine bul PD-TA-85411 is issued by General Chemical Div., Allied Chemical & Dye Corp., Dept. CP, 40 Rector St., New York 6, N.Y. Specify 9698 opposite last page.

Over 3500 organic chemicals

More than 3500 organic chemicals are described in this 224-page, 6x9 1/2" catalog. Most of these are research chemicals with long-sounding names, but you'll find many of the old standbys listed, too. Quantity and price data are given.

"Eastman Organic Chemicals List No. 40" is issued by Distillation Products Industries, Div. of Eastman Kodak Co., Dept. CP, Rochester 3, N.Y. Check 9699 opposite last page.



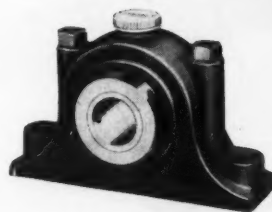
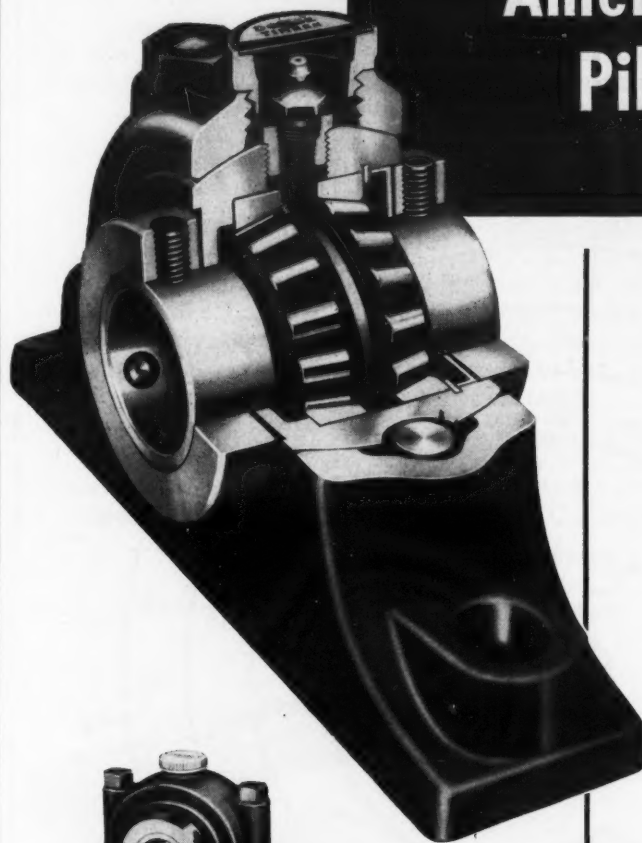
"Reckon we oughta shut down, Joe?"

Sent in by Paul Hogroian, E. I. du Pont de Nemours & Co., Inc., Louisville, Ky.

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DODGE-TIMKEN

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Call the Transmissioneer, your local Dodge Distributor. Factory-trained by Dodge, he can give you valuable assistance on new, cost-saving methods. Look for his name under "Power Transmission Machinery" in your classified telephone directory, or write us.

DODGE-TIMKEN Bearings are adjusted, lubricated and sealed at the factory. Labyrinth seals effectively retain the lubricant and prevent the entrance of dust and dirt. The inbuilt precision of Dodge-Timken Bearings is protected both on and off the shaft. They are delivered fully assembled, ready to mount.

Where service conditions are toughest Dodge-Timken Bearings prove their quality decisively. For superior performance, dependability and long life they have won their reputation throughout industry as America's quality pillow blocks.

To meet varying service requirements Dodge-Timken Pillow Blocks are available in five types—the type E.. Double Interlock (illustrated).. Type C.. Special Duty ... and All-Steel. Available in a range of shaft sizes from 1-3/16" to 10".

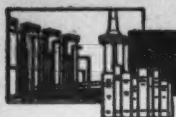
Call your Transmissioneer; or write for Bulletin A638 giving load ratings, dimensions and other data on Dodge-Timken Roller Bearings.

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DODGE

of Mishawaka, Ind.

When inquiring check 9700 opposite last page

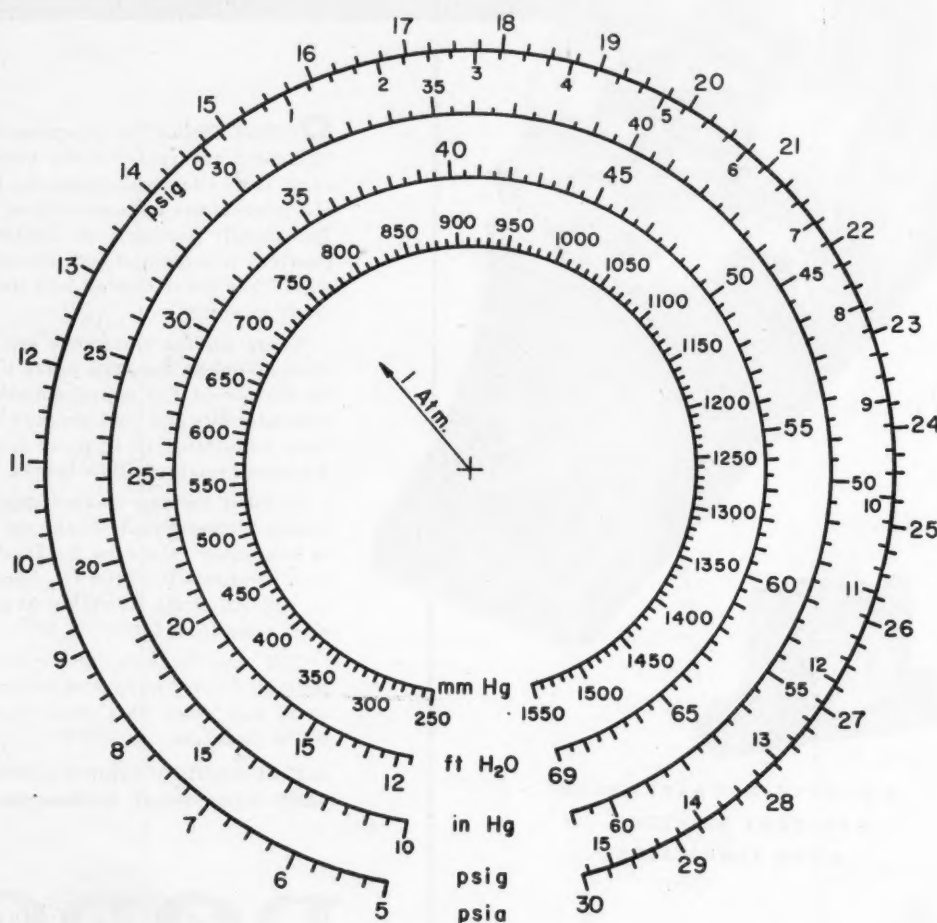


Pressure Conversion

Nomograph by CP Staff

Conversion of pressure into various units is a relatively simple operation. However, conversion of a large amount of data is sometimes tedious and prone to error. This nomograph converts pressures from one set of common units to any or all of

four others (psia, psig, in Hg, ft H₂O, and mm Hg). To use a nomograph, simply place the straight edge so that it intersects the known value and lies across the center of the bullseye. Readings on all scales will then be equivalent.



O-RINGS

are a valve's best friend

Let's face it . . . dripping, leaky valves are just not socially acceptable . . . so, we designed the new Hoke bar stock needle valve with an O-ring stem seal—to give it the right start in life. Result—a seal that will pass a helium leak test and no leaky, messy packing adjustments—ever. No friction either (even at high pressure)—you can operate the valve with a fingertip touch. There's a new, self-aligning spindle which shuts off tight time after time without galling or binding.

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P.S. We've just published a new wall chart on Hoke valves with valuable information on valve sizing and corrosion resistance. May we send you one?



HOKE INCORPORATED

Fluid Control Specialists

145 S. DEAN STREET, ENGLEWOOD, N. J.

When inquiring check 9701 opposite last page

CHEMICAL PROCESSING

Chemical and physical data on 16 lithium compounds

Detailed data on the uses and chemical and physical properties of 16 lithium compounds are contained in 38-page folder. Folder is in loose leaf form to provide for insertion of new data as they become available.

"Chemical and Physical Properties of Lithium Compounds," is issued by Foote Mineral Co., Dept. CP, 18 W. Chelton Ave., Philadelphia 44, Pa. When inquiring specify 9702 on form opposite last page.

Commercial industrial chemicals

Spiral-bound, 68-page manual contains general information on commercial industrial products offered by this division. Ammonia and ammonium nitrate, ethanalamine, ethylene oxide, formaldehyde, ethylene glycols, methanol, sodium nitrate, and urea are covered.

"Industrial Chemicals" may be obtained by writing directly to Dept. IC, Nitrogen Div., Allied Chemical & Dye Corp., Dept. CP, 40 Rector St., New York 6, N.Y.

Information on niacin production

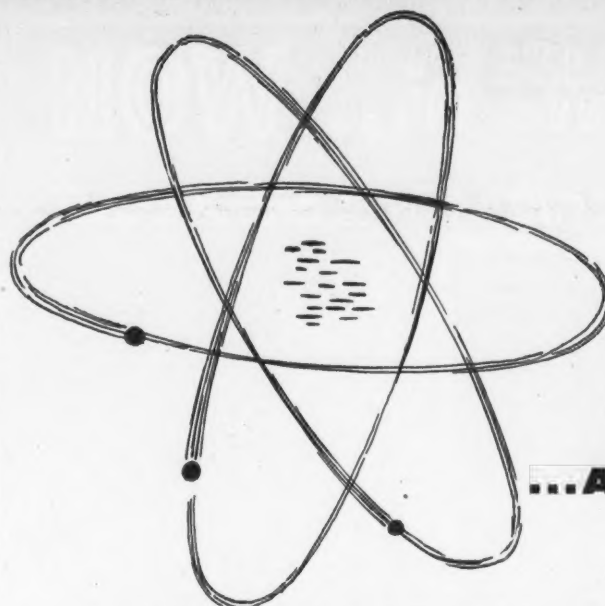
Four-page bulletin gives general description of applications of niacin for human and plant nutrition, and for formulation of B-complex vitamin tablets and capsules. Typical analysis of manufacturer's niacin is compared with USP specifications.

Bul T-102-56 is issued by Tar Products Division, Koppers Company, Inc., Dept. CP, 1450 Koppers Building, Pittsburgh 19, Pa. When inquiring specify 9703 on form opposite last page.

Synthetic organics cataloged

Seventy-seven synthetic organic compounds for use as intermediates, solvents, surface-active agents and fuel gas odorants are cataloged in 12-page booklet that is punched for notebook insertion. Name, description, and suggested uses are presented. Industries for which chemicals are destined: rubber, paper, mining, oil refining, paint, textiles, plastics, agricultural chemicals and pharmaceuticals.

Cat S-101 is issued by Dept. S, Industrial Div., Pennsylvania Salt Mfg. Co., Dept. CP, 3 Penn Center Plaza, Philadelphia 2, Pa. When inquiring check 9704 on form opposite last page.



*Simplify
Handling of Fluids,
Vapors and Gases*

...AND "HOT" MATERIALS

Selected for use in certain Atomic Energy Commission operations, the simple sound design of Penberthy ejectors plus Penberthy "know-how" has provided dependable service in processes involving the handling of dangerous corrosive liquids and gases. These same advantages are being realized in chemical processing, dairy, food, textile, plating, paper and many other industries.

Trouble-free Penberthy ejectors (with no moving parts to get out of order) are available in bronze, iron, stainless steel, plastic and other materials . . . in standard and made-to-order designs. Get the facts. Write for Catalog 36.

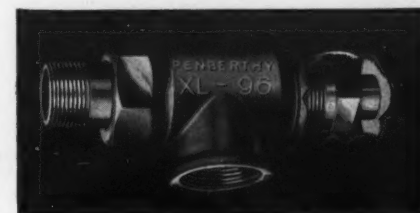
PENBERTHY MANUFACTURING COMPANY

Division of the Buffalo-Eclipse Corporation
1242 Holden Avenue Detroit 2, Michigan

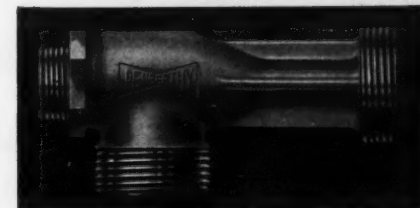


Special stainless steel where corrosion resistance and/or non-contamination are required.

Series 60 P corrosion-resisting
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Rigid. Tough. Lightweight.



Series 1A and 20A Ejectors perform efficiently over a wide range of operating conditions.



Series 60A fluid operated jet pump for lifting, elevating and blending liquids or slurries.



Special jet pump for handling corrosive chemicals. Stainless steel with flanged connections.

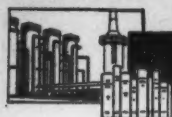
PENBERTHY EJECTORS

STEAM, AIR & LIQUID OPERATED FOR:

Liquid Transfer, Heating, Circulating, Aerating,
Agitating, Mixing, Pumping, Blending and Exhausting Air
or Vapor against High Vacuum.

There's Certain Satisfaction in **PENBERTHY** Cycling Jet Pumps • Ejectors • Injectors • Electric Sump Pumps

When inquiring check 9705 opposite last page



Hypochlorite Residual

by G. W. LEWIS, JR.,
Scott Paper Co.
and
CLAUDE McQUILLEN, JR.

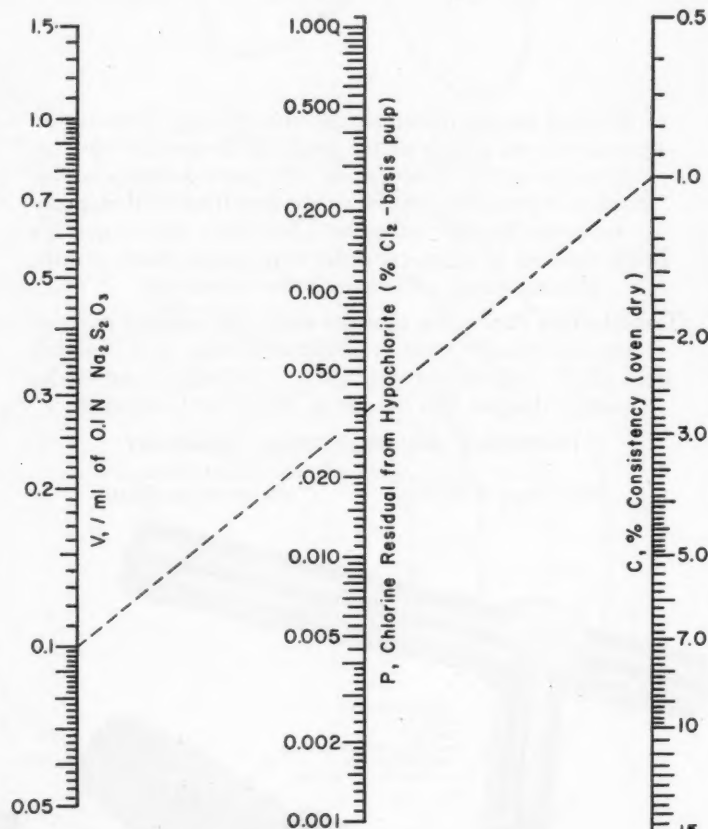
The percent residual chlorine due to hypochlorite bleaching of wood pulp is a very important factor and can be determined by substituting into the following equation:

$$P = \frac{0.355V(100 - C)}{100C}$$

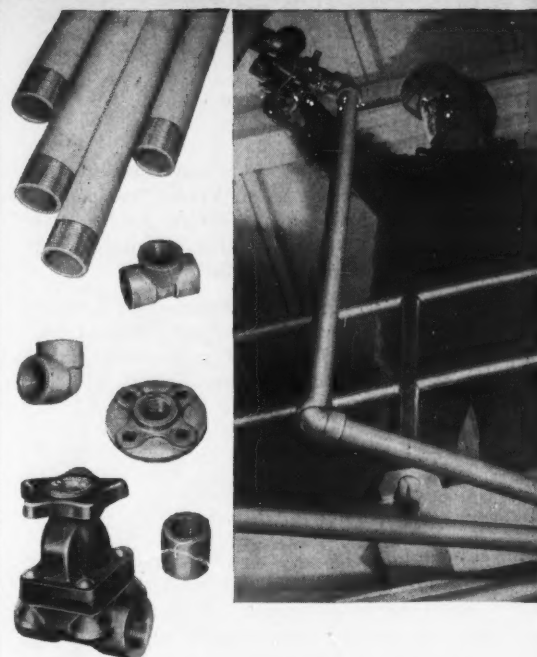
V = volume ml
C = consistency --
P = residual Cl_2 %

Typical Example

Pulp consistency is found to be 1.0 percent and 0.1 ml of 0.1 N $\text{Na}_2\text{S}_2\text{O}_3$ is required for the titration. Connecting these two values on the nomograph with a straight line, the answer reads 0.035% chlorine (basis pulp).



180



Peak Performance by *Van-Cor* PIPING

An Ohio plant was faced with high pipe maintenance costs because the acetic acid produced is strong enough to eat holes in steel. Instead they installed Van-Cor plastic piping that is still good as new after 18 months' service.

Van-Cor pipe, fittings and valves have solved similar problems with scores of corrosive chemicals. An unplasticized polyvinyl chloride, Van-Cor weighs less, and is easier to install, than conventional piping. It serves longer, thus costs far less . . . Van-Cor sheets are also fabricated into ducts, hoods, tanks, fumestacks, etc.

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SUBSIDIARY OF THE VAN DORN IRON WORKS CO.
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When inquiring check 9706 opposite last page

CHEMICAL PROCESSING

**Explains operating principle
of ultrasonic flowmeter**

Four-page data sheet explains operating principle of ultrasonic flowmeter. Block diagram, a combination of volumetric and mass circuitry, shows how instrument works. Performance data, including range, accuracy, and pressures, are given. Ultrasonic flowmeter described uses electro-acoustic techniques to measure volumetric or mass flow rates with negligible pressure drop.

Ultrasonic Flowmeter is issued by Maxson Instruments, division of The W. L. Maxson Corp., Dept. CP, 47-37 Austell Place, Long Island City 1, N. Y. Specify 9707 opposite last page.

**Six-scale slide rule calculates
additive cost per barrel**

Slide calculator is designed to give accurate, rapid cost calculation for chemicals that are used in parts-per-million treatment rates. Two other scales are designed to help convert API gravity to pounds per gallon and degrees Centigrade to degrees Fahrenheit.

Chemical Additive Calculator is available from Armour and Company, Chemical Div., Div. CP, 1355 W. 31st St., Chicago 9, Ill. When inquiring specify 9708 opposite last page.

**Processing equipment facilities,
services outlined in catalog**

Manufacturer's facilities for fabricating various chemical processing equipment are pictured and described in 30-page catalog. Over 60 photographs illustrate the many different kinds of equipment being produced. Included are stills, tanks, hoods, coolers, and biological enclosures. All units are constructed of stainless steel, specialized alloys, or light metals.

"Guide for Purchasing Alloy Sheet and Light Plate Fabrication" is issued by S. Blickman, Inc., Dept. CP, Weehawken, N. J. When inquiring specify 9709 opposite last page.

**Background on present-day
polystyrene production**

Three-page bulletin outlines some of the problems encountered and summarizes requirements for production of present-day high quality commercial polystyrene.

Bul TSB-8-56 is issued by Chemical Div., Koppers Co., Inc., Dept. CP, 1450 Koppers Bldg., Pittsburgh 19, Pa. Specify 9710 opp. last page.

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When inquiring check 9711 opposite last page



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Flash Tank

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When inquiring check 9712 opposite last page



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with...P.V.C. (polyvinyl chloride)

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**MICRO-FLOW
GLOBE VALVES**

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When inquiring check 9713 opposite last page

NEW LITERATURE

Wall charts present instruction for chlorine-caustic handling

Printed on weather proof, plastic-impregnated paper, charts are suitable for hanging in outdoor or indoor areas.

Chlorine chart describes proper procedures for unloading tank cars and ton containers, precautions in case of a leak, and first-aid measures after exposure.

The caustic soda chart gives steps for unloading tank cars of 50 percent and 73 percent caustic. Safety "do's" and "don'ts" to be observed in handling material are listed. It also includes instructions for preparation of tank cars for return trip to manufacturer.

Chlorine and Caustic Soda wall charts are issued by the Industrial Chemicals Div., Olin Mathieson Chemical Corp., Dept. CP, Baltimore 3, Md. When inquiring specify 9714 on form opposite last page.

Guide to applications of tubular products

Series of technical data cards gives engineering information and specifications on carbon, alloy and stainless steel tubing, pipe, fittings, and extrusions. TDC 186 is a ready cross reference between the steel, application, and specification covering product. TDC 145-A and 146-A present engineering data on chromium molybdenum alloy steel products. Bul TB 413 covers high-alloy, stainless, and non-ferrous extrusions. Bul FB-502 deals with seamless welding fittings and flanges of carbon, alloy, and stainless steels.

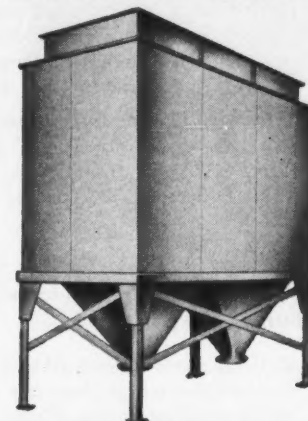
TDC 145-A, 146-A, 186 and Bul FB-502, TB 413 are issued by Tubular Products Div., of The Babcock & Wilcox Co., Dept. CP, Beaver Falls, Pa. When inquiring specify 9715 on form opposite last page.

Describes facilities, operation of nuclear laboratories

Ten-page booklet describes organization, facilities, and operation of consulting firm's nuclear laboratories. Outlined are services offered by the company in such fields as reactor design, nuclear instrumentation, and experimental studies. A separate section of the booklet relates the Laboratories' experiences in the nuclear energy field.

Nuclear Laboratories' booklet is issued by Walter Kidde Nuclear Laboratories, Inc., Dept. CP, 975 Stewart Avenue, Garden City, L. I., N. Y. When inquiring specify 9716 on form which is located opposite last page.

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When inquiring check 9717
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CHEMICAL PROCESSING

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When inquiring check 9719 opposite last page

NEW LITERATURE

Over 400 reagents and chemicals cataloged and described

Over 400 analytical reagents and other chemicals useful in the lab are listed and described in this 200-page, digest-size catalog. Specs, prices are given. Atomic weights, storage data, and a chart for specifying reagents are included.

"1956 A.R. Catalog" is issued by Mallinckrodt Chemical Works, Dept. CP, Second and Mallinckrodt Streets, St. Louis 7, Mo. When inquiring check 9720 on the convenient Reader Service slip which is located opposite last page.

Plastic terminology explained

Over 85 definitions, for such terms as bonding strength, center expansions, delamination, flexural strength, postforming, are listed and explained in this four-page glossary.

"Glossary of Plastic Terms" is issued by The Richardson Co., Dept. CP, 2769 Lake Street, Melrose Park, Ill. When inquiring specify 9721 on form opposite last page.

Describes control service for planning systems

Twelve-page brochure describes a service organization set up to plan instrument systems and solve complex instrument problems. Facilities, background of staff, and typical accomplishments to date are reviewed.

"A New Concept . . ." is issued by Feedback Controls, Inc., Dept. CP, 899 Main St., Waltham 54, Mass. When inquiring specify 9722 on form opposite last page.

Isotope sources now indexed

The source of every known commercially-available isotope is presented in this 64-page, octavo-sized book. Included are stable and radioactive isotopes and hundreds of isotope-labeled compounds of C¹⁴, I¹³¹, P³², and S³⁵, and deuterium. Over 2000 items from more than 40 US and Canadian suppliers are listed and described. Prices are given.

"The Complete Purchasing Guide to the Isotopes" may be obtained by remitting \$2.00 to Publications Dept., Scientific Equipment Corp., Dept. CP, 23 N. Hawthorne Lane, Indianapolis 19, Indiana.

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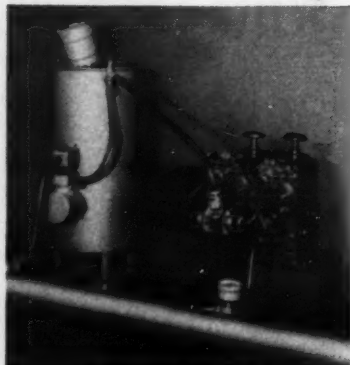
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PROVIDENCE, RHODE ISLAND

When inquiring check 9726 opposite last page

NEW LITERATURE

Shows how slurry density was held constant

Illustrated with flow sheets and diagrams of instruments, six-page publication shows methods which have been used to control slurry density. Control instrument uses radioactivity and absorption of radiation to find density. Typical results are shown in comparative recorder charts before and after installation of control system.

Data Sheet 501A is issued by Isotope Products, Inc., 1700 Niagara St., Buffalo 7, N.Y. When inquiring specify 9727 on form opp. last page.

Describes vest-pocket calculator

Printed in two colors, brochure describes calculating machine small and light enough to carry in your pocket yet having accuracy and performance of standard desk calculator.

Brochure contains direction for use, pictures and specifications of unit.

"Meet Curta!" is issued by the Utility Supply Co., Dept. CP, 229 S. Wabash Ave., Chicago, Ill. Specify 9728 on form opposite last page.

Protective coatings manual

Useful protective coating data in the form of charts, tables, diagrams, and illustrations are presented in manual which serves as a practical workbook to the maintenance engineer. One table gives resistance rating of each coating to over 200 corrosive agents. Care and cleaning of brushes and spray equipment is explained.

Bul 760 is issued by Plastics and Synthetics Div., The U. S. Stoneware Co., Dept. CP, Akron 9, Ohio. Specify 9729 opp. last page.

Handbook of information about organic solvents

Pocket-size, 68-page handbook gives properties of popular organic solvents, applications, definitions of trade terms, and descriptions of standard tests. Discussed are the petroleum naphtha solvents, aromatics, and terpenes; alcohols, glycols, and amines; esters, ketones, and glycol ethers; and chlorinated solvents. Included in this new edition is information on synthetic glycerine and on a low end point petroleum naphtha.

"Organic Solvents Handbook — 1956 Edition" is issued by Central Solvents & Chemicals Co., Dept. CP, 2540 W. Flournoy St., Chicago 12, Ill. When inquiring check 9730 on form opposite last page.

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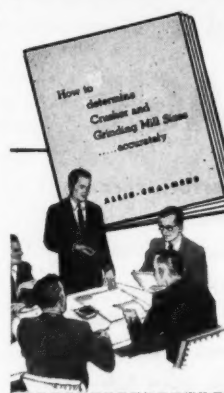
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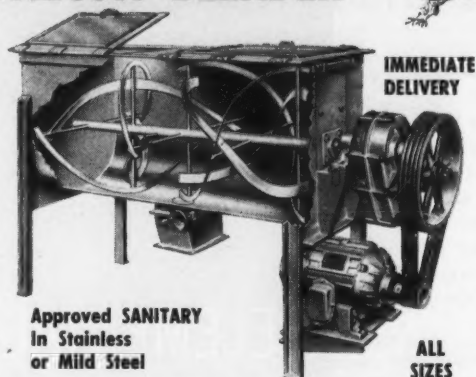
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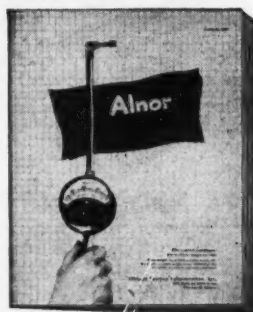
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When inquiring check 9734 opposite last page

DECEMBER 1956

NEW LITERATURE

Brochure 'opens the door' to unit operations

Illustrated 12-page brochure explains how evaporation, crystallization, filtration, pulp washing, and spray drying can reduce costs and improve quality in process industries. Almost 30 photographs are used to depict installation of equipment in food, chemical, paper, fertilizer, textile, and other plants. Also included is information on research, testing, and engineering services available from manufacturer.

"An Open Door" is issued by Swenson Evaporator Co., A Div., of Whiting Corp., Dept. CP, Harvey, Ill. Specify 9735 opposite last page.

Reference on chemistry of fatty acids

A comprehensive and convenient reference work of 48 pages reviews composition of fats and oils, sources and chemical makeup of fatty acids. Handling, test methods, and explanation of terms are presented.

"The Chemistry of Fatty Acids" is issued by Chemical Div., Armour & Co., Dept. CP, 1355 W. 31st St., Chicago 9, Ill. When inquiring specify 9736 on form opposite last page.

Engineering manual offered on graphite heat exchangers

Principles of operation, advantages, applications, and design data of stacked graphite-block heat exchangers are presented in 14-page manual. Complete with photographs, drawings, charts, and tables, manual includes data on heat transfer coefficients, pressure drops, flow rates, etc. Full-page table lists corrosion resistance of the units for various chemical reagents.

Engineering manual is issued by The Carbone Corporation, Dept. CP, Boonton, N. J. When inquiring specify 9737 opposite last page.

Nitroparaffin symposium

Booklet of 50 pages contains full texts of papers presented at series of nitroparaffin symposiums. Topics discussed include: nitroparaffin chemistry; future of nitroparaffins; NP's as solvents for technical coatings; and electrophoretic deposition from nitroparaffin suspensions.

"Nitroparaffin Symposium" is available from Commercial Solvents Corp. Dept. CP, 260 Madison Ave., New York 16, N.Y. When inquiring specify 9738 opposite last page.

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NOISES from intake and discharge
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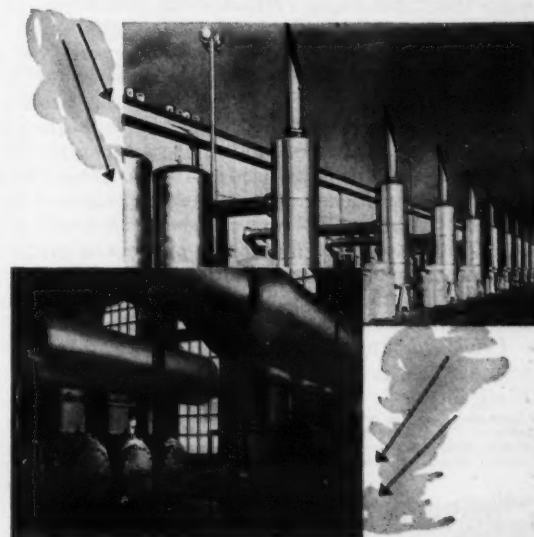
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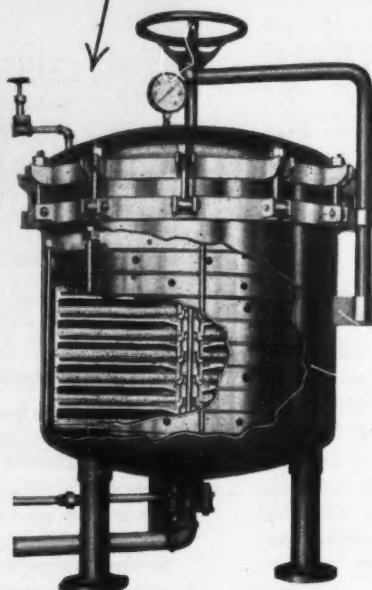
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SPARKLER HORIZONTAL PLATE FILTERS

Versatile adaptability makes this filter the logical choice of filtration engineers for difficult filtering problems.

Plate assembly is especially designed with positive seal to prevent trapping of air.



Every filtering job usually presents an individual problem involving a combination of various kinds of screens, papers and filter aid. Frequently temperatures are encountered that call for a brine or steam jacketed tank. Linings; plastic or rubber may be needed, with tank and plate metals to fit the product such as mild steel, monel, nickel, stainless steel, bronze or Hastelloy. Constructed to meet ASME specifications when required.

All these structural and material combinations are easily achieved with the Sparkler Horizontal Plate filter.

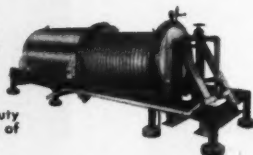
No fibrous adhesive material is ever required to hold the filter cake on the horizontal plate. The cake is firmly supported on the plate with no danger of cracking or slipping even with a variation in pressure or a complete shutdown in the filtering operation. The patented Sparkler scavenger plate filters almost the last drop in a batch, and allows practically a complete recovery of the product.

Constant filtering quality is maintained from start to the end of the cycle, no break through can occur in a Sparkler Horizontal Plate filter.

Place your filtering problem in the hands of our filtration engineers. They have developed many successful methods of filtering difficult materials and may be able to prescribe a solution to your problem without wasteful experimentation.

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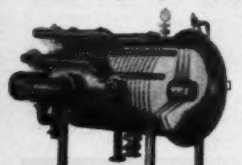
Model MCR heavy duty filter. Up to 1000 sq. ft. of plate area.



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Sparkler International Ltd. with plants in Canada, Holland, Italy and Australia—Service representatives in principal cities throughout the world.



Model SCJ heavy duty water filter. Capacities up to 5,000,000 gal. per day.

For over a quarter of a century, engineers and manufacturers of a complete line of industrial filtration equipment.

Canadian Chemicals Today

(Continued from page 7)

bear lower duties than any other, and Canadian tariff policy makes it much more difficult to obtain higher tariffs in this area, where they would be of real assistance, than in other categories. As markets grow, most of these chemicals will ultimately be made in Canada; however, the absence of tariff assistance seriously delays the arrival of this day. Of course, it may be that future technological improvement will permit the economic production of chemicals in smaller units, thereby aiding us with our small markets.

It is evident, then, that a substantial portion of Canadian chemical requirements will continue to be met by imports. Over the long term, Canadian manufacturers will find the most fertile ground for diversification in the medium volume synthetic organics field, such as primary plastics, solvents, organic agricultural pesticides, and similar materials not now produced domestically. In the next few years, displacement of imports of this type will occur, but at a less rapid rate than in the recent past, and under the conditions which I foresee at least a fifth of Canadian chemical needs will be supplied by other countries. In the meantime, the search for opportunities to displace imports with domestic production, to increase facilities for chemicals already being manufactured in Canada, and to undertake the output of products outside the field of chemicals and allied products, will I feel certain, keep the Canadian chemical companies busy for some time to come.

From an address before the Chemical Market Research Association



Drawn by Bill Dykes from idea developed by Ray Dietrich. Both work for Atlas Powder Company, Chattanooga, Tenn.

ELEMENTAL BORON

in commercial quantities

manufactured to meet your specific needs!

Today's elemental boron, no longer a laboratory curiosity, is a fast-growing chemical with important commercial aspects. For those working in Boron Chemistry, Trona* now offers several grades of elemental boron to meet your specific needs. Trona, a world leader in the development of commercial boron, has the technical know-how and production facilities to fill your orders in any quantity without delay.

CURRENT FIELDS OF APPLICATION:

In the Military, elemental boron is being used in Ordnance applications for flares, fuses, ignitors, and propellant mixtures. Commercially, it is used in borides for high temperature applications, and with plastics for lightweight neutron shields.

To get more information about Trona's special grades of elemental boron, call your Trona technical representative today.

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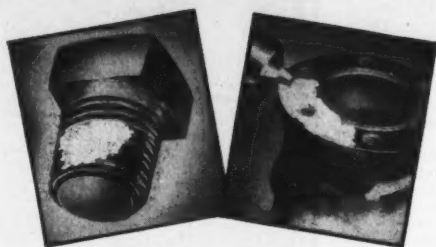
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CHEMICAL PROCESSING

When inquiring check 9740 opposite last page

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Leak Lock has the ability to hold chemical solutions and gases that would eat through ordinary joint compounds. It has extraordinary adhesion and remains flexible indefinitely.

During the past six years, Leak Lock has found its place in the chemical, petroleum, atomic energy, electronic, refrigeration and many other industries in constantly increasing uses for special purposes and as the answer to many "unsolvable" joint problems.

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Leak Lock

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DECEMBER 1956

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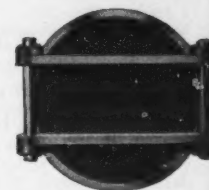
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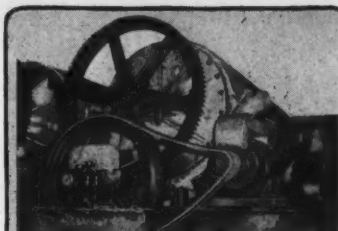


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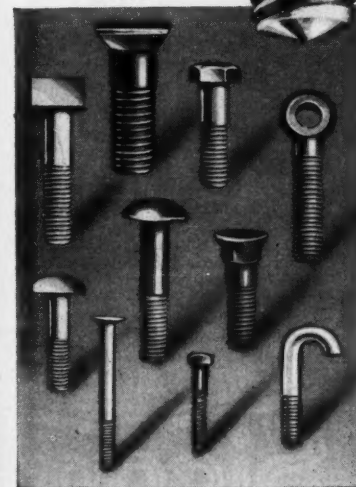
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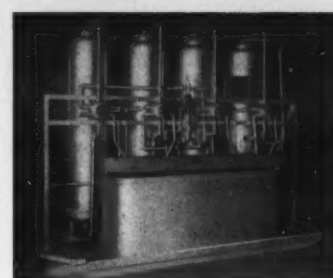
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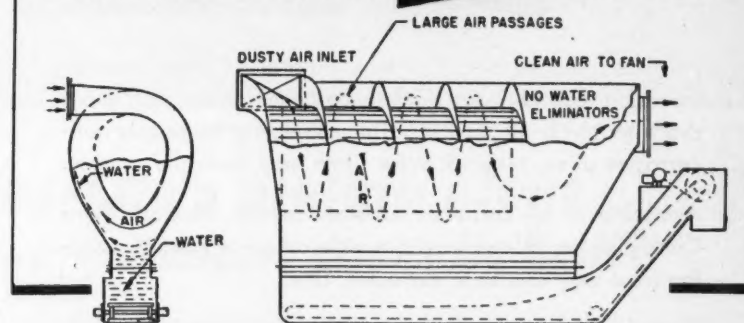
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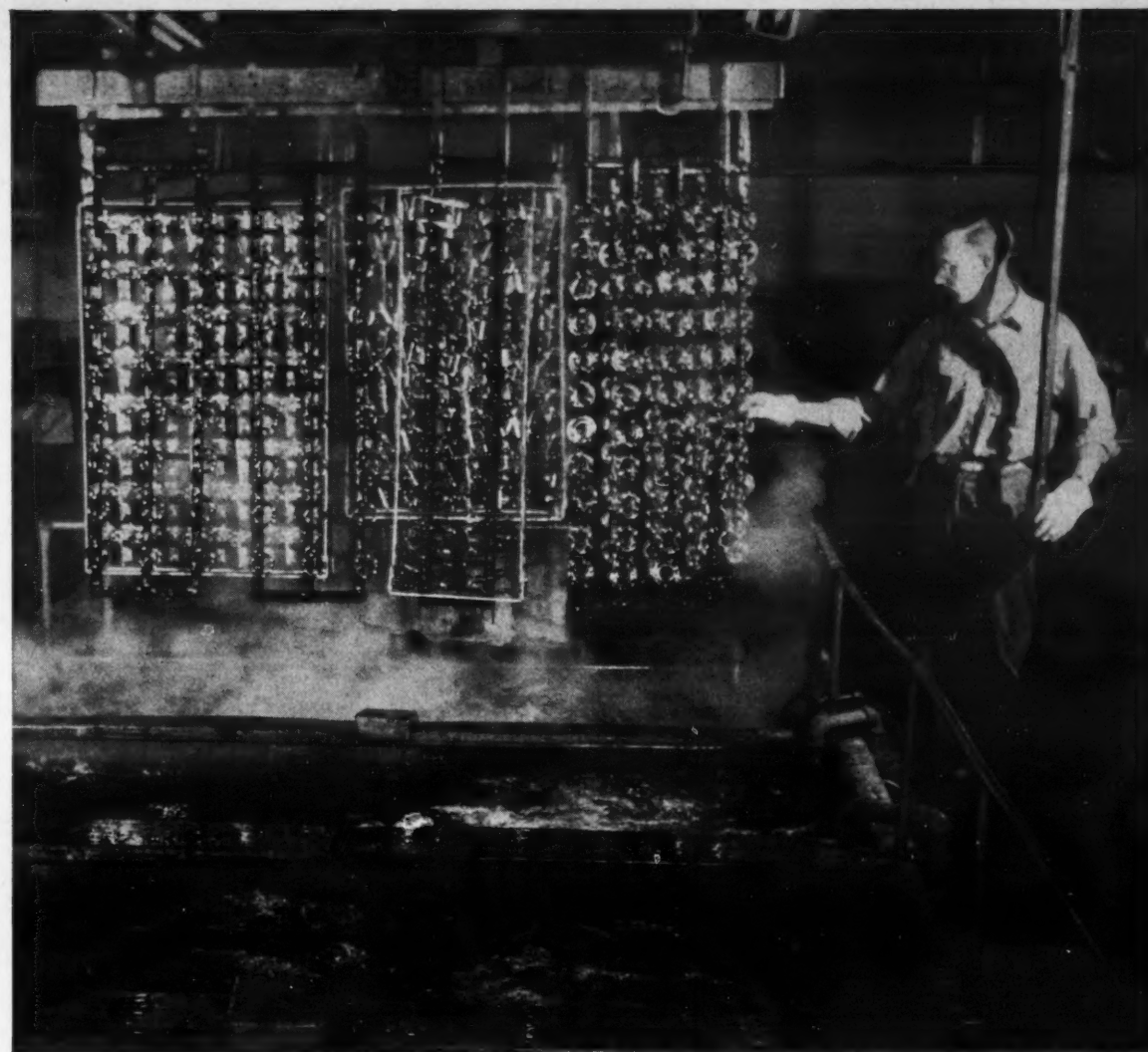
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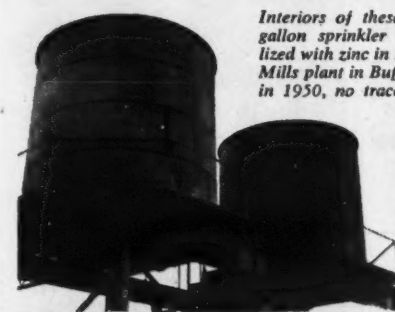
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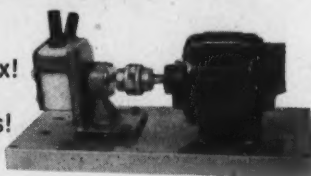
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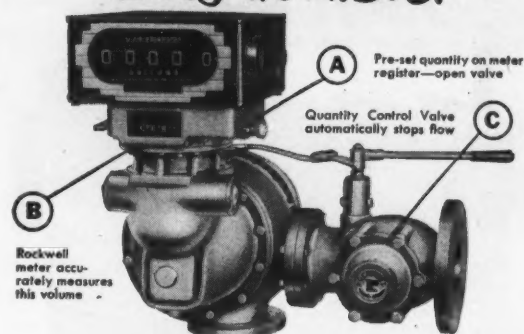
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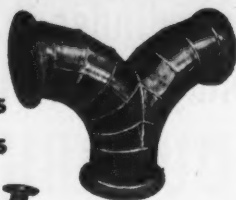
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... for alphabetical index of all processes, materials, services, and equipment discussed in this issue's editorial columns and advertisements, turn to page 205. "Quick-locator" starting on that page was a feature in CHEMICAL PROCESSING years ago. It means extra work for the Editors, but it helps you, the reader, in finding what you want ... in a hurry!

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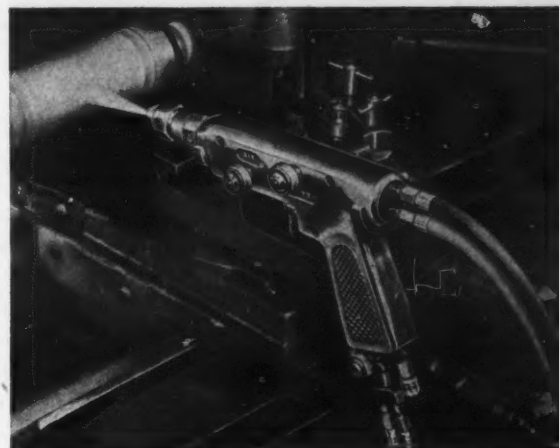
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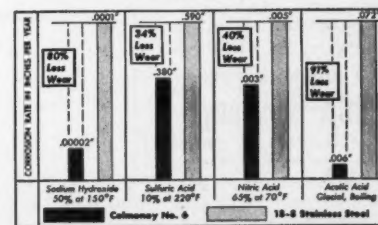


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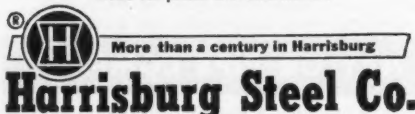
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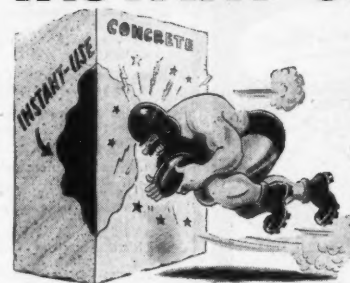


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| 9510 | Fittings | 9560 | Enclosed Busway | 9616 | Corrosion-resistant Heat Exchanger | 9676 | High Styrene Resin | 9734 | Mixers |
| 9511 | Spray Nozzle | 9561 | Industrial Lubricant | 9617 | Protective Coatings | 9677 | Silicone Water Repellent | 9735 | Cutters |
| 9512 | Coated-fabric Glove | 9562 | High Pressure Gages | 9618 | Corrosion-resistant Tubing | 9678 | Tractor-shovels | 9736 | Surface Thermometers |
| 9513 | Dosimeter | 9563 | Submerged Positive Displacement Pump | 9619 | Conveyor | 9679 | Hydrazine for Water Treating | 9737 | Processing Equipment |
| 9514 | Respirator | 9564 | Spectacle Blinds | 9620 | Crushers | 9680 | Impulse Steam Trap | 9738 | Fatty Acids |
| 9515 | Flammable Liquids | 9565a | Agitator | 9621 | Communication System | 9681 | Expansion Joints & Flexible Couplings | 9739 | Graphite Heat Exchangers |
| 9516 | Air Sampling & Measurement | 9565b | Side-drive Agitator | 9622 | Nuclear Counters | 9682 | Mylar Comparator | 9739 | Nitroparaffins |
| 9517 | Seal-less Pump (state application) | 9565c | Flamix | 9623 | Phenolic Molding Compound | 9683 | Electrical Switches | 9740 | Snubbers (state problem) |
| 9519 | Portable Resuscitators | 9566 | Slurry Pump | 9624 | Steam traps | 9684 | Fluorescence Meters | 9741 | Horizontal Plate Filter |
| 9522 | Apron Conveyor Dryer | 9567 | Relacing Tool | 9625 | Inert Generator | 9685 | Slurry Mixer | 9742 | Amorphous Elemental Boron |
| 9523a | Clarifiers | 9568 | Variable-speed Pulley | 9626 | Nuclear Products | 9686 | Magnetic Separator | 9743 | Pipe Joint Compound |
| 9523b | Centrifuges | 9569a | Silent Check Valve | 9627 | Protective Coatings | 9687 | Steam & Hot Water Generator | 9744 | Gage Glass & Cylinder |
| 9524 | Demineralizer | 9569b | Cause Effect & Control of Water Hammer | 9628 | Scale Models | 9688 | Aliphatic Nitrogen Compounds | 9745 | Manway |
| 9525 | Conical Dryer-blender | 9570 | Hydraulic Bender | 9629 | Armored Multitube System | 9690 | Ovens | 9746 | Technical Data Book |
| 9526 | Stainless Steel | 9571 | Visual Control Board | 9630 | Polyvinyl Alcohols | 9691a | Pilot Plant Equipment | 9747 | Balls |
| 9527a | Mixers | 9572 | Control Valve | 9631 | Disaster Repairs of Electrical Apparatus | 9691b | Ammoniator-Granulator | 9748 | Baths |
| 9527b | Material Handling Equipment | 9573 | Heat Exchangers | 9632 | Battery | 9691c | Dryer | 9749 | Lubricants |
| 9528 | Low-fin Tube | 9574 | PVC Diaphragm Valve | 9633 | Diaphragm Valves | 9692 | Tube Cleaners | 9750 | Eye Bolt |
| 9529 | Heat Exchangers | 9575 | Boilers | 9634 | Filters | 9693a | Aromatic Chemicals | 9751 | Demineralizers |
| 9530a | Electric Heaters | 9576 | Metering Pump | 9635 | Rotary Pressure Joint | 9693b | Essential Oils | 9752 | Dust Collector |
| 9530b | Applications of Electric Heat | 9577 | Dust Filter | 9636 | Water Hammer Shock Absorber | 9694 | Deceration | 9753 | Corrosion-resistant Wire Cloth |
| 9531 | Mobile Filter | 9578 | Bronze Valve | 9637 | Water, Sewage, & Waste Treating Equipment | 9695 | Combustion Controllers | 9754 | Silicone Coatings |
| 9532 | Solids Pump | 9579 | Vacuum Pump | 9638 | Plastic Tube & Rod | 9696 | Couplings | 9755 | Ion Exchangers |
| 9533 | Filter Fabrics | 9580 | Dust Control System | 9639 | Air-Hydro Pumps | 9697 | Valves | 9756 | Rotary Hot Air Dryer |
| 9534 | Pressure Centrifuges | 9581 | Orlon Filter Bags | 9640a | Tubular Conveyor | 9698 | Fluorine | 9756a | Emergency Shower |
| 9535 | Rubber-molded Filter Leaves | 9582 | Bonnetless Forged Steel Valves | 9640b | Bucket Elevator | 9699 | Organic Chemicals | 9757a | Mixers |
| 9536 | Fin-tube Heat Exchangers | 9583 | Tellon Fabrication (state which) | 9641 | Airflow Valve Bag Packer | 9700 | Bearings | 9757b | Roller Mills |
| 9537a | Turbine & Paddle-type Top or Bottom Entering Mixer | 9584 | Unions | 9642a | Back-up Flange | 9701 | Valves | 9757c | Kneaders |
| 9537b | Propeller-type Top-entering Mixer | 9585 | Industrial Fan | 9642b | Flange Slide Rule | 9702 | Lithium Compounds | 9757d | Grinding Equipment |
| 9537c | Side-Entering Mixer | 9586 | Stainless Heat Exchangers | 9643 | Prebreakers | 9703 | Niacin | 9758 | Protective Coating |
| 9537d | Mixing Data Sheet | 9587 | Air & Electric Vibrator | 9644 | Lift Trucks | 9704 | Organic Chemicals | 9759 | Anti-seize Thread Compound |
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| 9539 | Gas Liquefier | 9593 | Steam-assist Desuperheater | 9650 | Compressor Troubles | 9710 | Polystyrene Production | 9765 | Corrosion-resistant Vessel |
| 9540 | Continuous Centrifuge | 9594a | Plastic Cutter | 9651 | Steel Products | 9711a | Heating & Cooling Coils | 9766 | Hard-facing Material |
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| 9541b | Radial Blade Fan | 9595 | Mixers | | | 9711c | Cooling Towers | 9768 | Teflon Packings |
| 9541c | Propeller Fan | | | | | 9711d | Air Washers | 9769 | Gas Cylinder |
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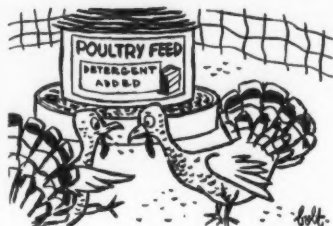
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**THAT'S
INTERESTING**

(Continued from page 2)



"One thing about this new feed
... you sure feel clean inside."

Detergents — a diet aid for turkeys

Field turkeys, subsisting on a diet of mash and wheat grain with 0.10% detergent added, gained more weight on less feed than those fed a standard diet. It seems the addition of a commercial alkyl-aryl sulfonate aided digestion of whole grain in the 235 birds being tested by H. J. Almquist and J. B. Merritt of the Grange Co. No toxic effects were noted. (*D & O News*)

Tires of the future

All-butyl-rubber tire developed by Esso Research and Engineering Co. shows a number of important advantages that should be of value to motorists of the future: stopping distance at 60 mph was 30% less; ride was smoother; and tire had excellent resistance to ozone degradation.

Leading them on

Night flying insects "see" ultra-violet part of the spectrum much better than human beings, and are attracted by black light much more than white light or even daylight-blue light. They are even more strongly attracted by filtered black light.

This fact is being used to control insects around plants operating at night, particularly paper mills. Filtered black light draws them away from buildings to an insect electrocutor.

For more information on product at right, specify 9770 ... see information request blank opposite last page. ➡

Any speed for you too!

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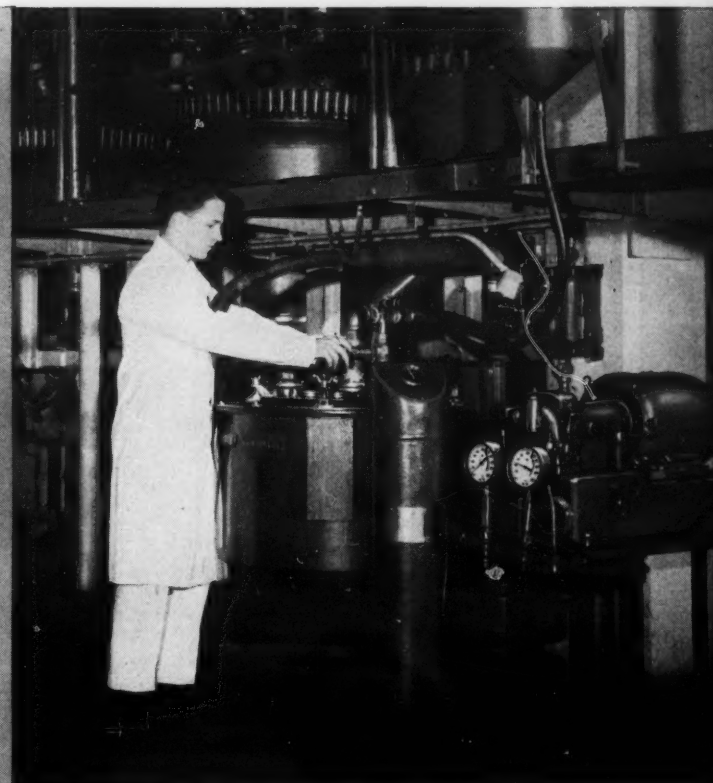
Any desired speed from zero to maximum ... any rate of acceleration ... any rate of deceleration ... any rate of hydrodynamic braking ... any speed adjustment between operations ... synchronization of two or more drives ... direct or remote precision speed control irrespective of load, input power or oil viscosity changes ... all with Oilgear Fluid Power "Any-Speed" Drives. Old and new users name them "*the drives*" for their heavy-duty needs. You probably didn't know this! Every day, people are equally surprised—and far more amazed when they know the facts. Write and get them now. THE OILGEAR COMPANY, 1583 W. Pierce Street, Milwaukee 4, Wisconsin.



This Centrifuge at powder plant in east

In a somewhat different application, these 4 Oilgear 60 hp "Any-Speed" Drives serve Tolhurst centrifuges in powder plant in the east. Centrifuge accelerates to 300 rpm for loading, to 900 rpm for 15-minute centrifuging, then decelerates to 70 rpm for "plowing." Unloading is automatic.

Tolhurst is a division of American Machine & Metals, Inc.



This Centrifuge at Abbott Laboratories

Leading house in pharmaceutical, drug and chemical field, Abbott Laboratories installed first Oilgear Drive on Tolhurst centrifuge in production department. Experience was so satisfactory it led to the inclusion of another Oilgear equipped Tolhurst centrifuge in their experimental laboratories.

SPECIFICATIONS: Speed continuously variable from zero to 1200 rpm max. (in this case). Full control of acceleration/deceleration speed and rate. Permits that infinitely modifiable speed best suited to loading, washing, spinning and unloading.

Photo Courtesy, Chemical Processing Magazine



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